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COLLECTION

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(12)

COW-POX

By

John Ring

from Abraham Rees's The Cyclopaedia; or universal
dictionary of arts, sciences, and literature. 1808, 10,



Also: INOCULATION, and SMALL-POX
from the same work, 1811, 19, and 1816, 33



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30th September, 1948

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Cyril C. Barnard, Esq.,
London School of Hygiene & Tropical Medicine,
Keppel Street,
London, W.C.1.

Dear Barnard,

I return your extracts herewith.
They are not from the Encyclopaedia Britannica
but from Abraham Rees's The Cyclopaedia; or
Universal Dictionary of Arts, Sciences, and
Literature. There are 39 volumes of this
work, all with titlepages dated 1819, but it
was in fact issued in instalments from 1802
to 1819. The instalment of vol.10 containing
Cow-Pox was issued in May 1808; that of vol.
19 containing Inoculation some time in 1811
or 1812; that of vol.33 containing Small-Pox
some time in 1816.

As for the question of authorship, Cow-
Pox was written by John Ring, as appears from
the final paragraph of the article itself.
The other articles may have been by him too.
The editor's remarks on his contributors in
the preface to vol.1 are too vague to be of
any help. More information was, I believe, given

was buried in St. Edmund's chapel, in Dereham church, where a tablet is raised to his memory by his affectionate friend and relation, lady Hesketh.

The person and mind of Cowper seem to have been formed with equal kindness by nature; and it may be questioned, if she ever bestowed on any man, with a fonder prodigality, all the requisites to conciliate affection and to inspire respect. He was beloved and revered by all who knew him, with a sort of idolatry. "I may," says Mr. Hayley, "be suspected of speaking with fond partiality the unperceived exaggerations of friendship; but the fear of such a censure shall not deter me from bearing my most deliberate testimony to the excellence of him whose memory I revere, and saying, that as a man he made, of all men whom I have ever had opportunities to observe so minutely, the nearest approaches to moral perfection. Indeed a much more experienced judge of mankind, and Cowper's associate in early life, lord Thurlow, has expressed the same idea of his character; for being once requested to describe him, he replied, with that solemn air of dignified elocution, by which he was accustomed to give a very forcible effect to a few simple words, "Cowper is truly a good man." Hayley's Life and Posthumous Writings of William Cowper, esq. Gen. Biog.

COWPER, WILLIAM, a celebrated surgeon and anatomist of London, was born about the middle of the seventeenth century, but in what year, or in what place, is not known. Of his first work, "Myotomia Reformata, or a new administration of all the Muscles of the Human Body," which was published in London in 1694, in 8vo. Haller says, "Although it may not be compared with the later works of Albinus on the subject, yet it far exceeds all that had preceded it, in correctness, and as containing delineations and descriptions of several muscles that had not been before observed." A splendid edition of this work was published by Dr. Mead in 1724, in folio, several years after the death of the author, with an introductory discourse on muscular motion, and some but not very important additions. More attention, on the whole, appears to have been paid to the elegance, than to the correctness of the figures, in this edition. In 1697, the author published, at Oxford, in folio, "The Anatomy of Human Bodies." The greater part of the plates, with which this magnificent work is illustrated, was purchased by some London booksellers, in Holland, and belonged to Bidloo's anatomy. Our author added 40 figures, from drawings made by himself. He also very much improved, and corrected the descriptions of the figures, given by Bidloo, and added some ingenious and useful anatomical and surgical observations. Bidloo, and with reason, complained of the plagiarism. Cowper answered his complaints, in a publication, called "Eucharistia," in which he gives a description of some glands, seated near the neck of the bladder, which have obtained the name of Cowper's mucous glands. He pretended to believe that the plates belonged to a work, projected by Swammerdam, but this excuse, for which there was no foundation, gained little credit. Two later editions of this work, which is still in great request, have been published, the one at Leyden, in 1737, the other at Utrecht in 1750.

Cowper was also author of several communications to the Royal Society, on the subjects of anatomy and surgery, which are printed in their Transactions, and of some observations inserted in the Anthropologia of Drake. He died in the year 1710. Haller Bib. Anat. General Biog.

COWPER'S Glands, in *Anatomy*, are two glandular bodies, varying in size, and situated at the bulb of the urethra.

Cow-Pox, or Cow-Pocks, in *Medicine*, the popular name

of a disease which, till lately, was never described by medical writers.

§ 1. Its Description and Origin.

This disease, in the brute animal, is commonly called the cow-pox; in the human subject the cow-pock. It appears on the teats of cows, in the form of irregular pustules, surrounded with inflammation. The colour of the pustules is a palish blue, approaching to livid. The animals become indisposed; and the secretion of milk is much lessened. Solutions of cerussa acetata, vitriolum zinci, vitriolum cupri, and other astringents, are a speedy remedy for the pustules; otherwise they degenerate into troublesome and obstinate ulcerations.

Similar effects are produced on the hands of the milkers; attended with febrile symptoms, and tumours in the armpits. The disorder is also sometimes communicated to other parts of the body by the nails of the patient, or some other cause.

It is the popular opinion in the county of Gloucester, and some other counties, that the cow-pox derives its origin from the heel of a horse; and that men who are employed in dressing horses, and also in milking, from want of cleanliness, transfer the virus from the horse to the cow. Dr. Jenner, however, is of opinion, that it is the thin fluid, of a darkish colour, oozing from a recent crack in the heel, and not the thick matter of grease, which possesses the property of exciting this disease; and that there is no other source to which the genuine cow-pox can be traced.

Many instances of this disorder in the human subject, together with the most authentic and satisfactory evidence of its originating from the horse, may be found in Dr. Jenner's "Inquiry into the Causes and Effects of the Variolæ Vaccinæ," published in 1798, in the London Medical Review, the Medical and Physical Journal, and in Ring's "Treatise on the Cow-pox," of which the first volume was published in 1801, the second in 1803.

It appears by the writings of Dr. Jenner, that farriers are frequently insusceptible of the small-pox, in consequence of their having been infected with this disease from the horse. It is, however, not always confined to the heel of the animal. Dr. Jenner relates a case, in which matter from the shoulder, and Dr. La Font of Salonica one, in which matter from the leg produced the genuine affection.

One strong argument, that it never proceeds from any other origin than the horse, is, that it has never been observed in Cheshire; where it is not customary for men, who have the care of horses, to be employed in milking.

Matter taken from the horse by Dr. Loy of Whitby, proved equally efficacious with that from the cow, both in the inoculation of the cow, and of the human subject. Dr. Sacco of Milan also made the same experiments with the same success. A portion of the same virus was transmitted by him to Dr. de Carro of Vienna, and by Dr. de Carro to Dr. Fries of Silesia; both of whom use it indifferently with vaccine matter, and find it produces a similar effect.

Some people suppose, that the cow-pox derives its origin from the small-pox; and that the infection is communicated to the cow by the hand of the milker; but this hypothesis is neither warranted by reason, nor confirmed by fact. There is no analogy to render it probable, that any poison is thus mitigated by transmission through the brute animal. The experiment has often been tried in many parts of the world. A local pustule has sometimes been excited; but the matter which it yielded has not succeeded in subsequent inoculations.

Were the cow-pox thus communicated to the cows, it
H h 2 would

would be as common in Cheshire as in Gloucestershire, as common in Scotland or France as in England, and as common in Asia or America as in Europe. As an additional proof that it is not thus produced, it will be sufficient to state the information received from Mr. Dalton, a surgeon at Madras. After observing, that he had not been able to procure genuine matter in India, in order to make experiments, or even to learn that horses in India are subject to the grease, he gives the result of repeated experiments which he made in the government gardens at Madras, by order of the governor, earl Powis, and in his presence.

To render these experiments as complete and satisfactory as possible, several milch-cows were selected; and some of them were inoculated by Mr. Dalton, in their teats and udders, with the most active variolous matter; while the teats of others were rubbed with it for a considerable time, till they became highly inflamed. No pustule was excited in any one of them; but ulcerations appeared on those teats, into which matter had been rubbed, the third day after the friction. Several young children were inoculated with the matter thus produced, and their arms inflamed and festered. They had also a slight degree of fever, which gave Mr. Dalton hopes that his experiment had succeeded, and that he had generated a mild species of small-pox; but on putting them to the test of variolous inoculation, they all had the small pox in the most indubitable manner, and regularly went through the disease. Mr. Dalton concludes with remarking, that all these circumstances will bear the strictest scrutiny; as they are well known to several medical practitioners at Madras.

§ 2. *On the Discovery and early Practice of Vaccination.*

It has been justly observed, that, for the discovery of this excellent art, we are indebted, under providence, to a fortunate concurrence of circumstances; first, to the talents of Dr. Jenner, secondly, to his education under the celebrated Hunter, and thirdly, to his situation in the vale of Gloucester. His inquiry into the nature of the cow-pox commenced about the year 1776. His attention to this singular disease was first excited by observing, that among those whom he inoculated for the small-pox, many were insusceptible of that disorder. These persons, he was informed, had undergone the casual cow-pox, which had been known in the dairies from time immemorial; and a vague opinion had prevailed, that it was a preventive of the small-pox.

He met with many apparent exceptions to this rule; which led him to ask the opinions of other medical practitioners in the neighbourhood, who all agreed, that the prophylactic power of the cow-pox was not to be relied on. This for a while damped, but did not extinguish his ardour; for he had the satisfaction to learn, that the cow was subject to various eruptions, called by that name, all of which were capable of infecting the hands of the milkers. Having surmounted this obstacle, he formed a distinction between the different kinds of pustular eruptions, to which the cow is liable; denominating one species the true, and all the others the spurious cow-pox.

This impediment to his progress was not long removed, before another, of far greater magnitude in appearance, started up. Instances were not wanting to prove, that when the genuine cow-pox broke out in a dairy, some persons who had experienced the disease resisted the small-pox, and others continued susceptible of that distemper. This obstacle, as well as the former, gave a painful check to his fond aspiring hopes; but reflecting that the operations of nature are for the most part uniform, and that when

two persons have had the cow-pox, it is not probable one should be perfectly shielded from the small-pox, and the constitution of the other remain unprotected, he resumed his labours with redoubled ardour.

The result was fortunate; for he now discovered that vaccine, as well as variolous matter, undergoes a change; and that when it has lost its specific property, it is still capable of producing a pustulous eruption. Hence, a person who milks a cow one day, may receive the infection of the genuine cow-pox, and be rendered for ever secure from the infection of the small-pox; while another, who milks the same cow the next day, may have a pustulous eruption, and perhaps a constitutional indisposition to a considerable extent, yet still remain susceptible of the variolous contagion.

While thus investigating the nature of the cow-pox, he was struck with the idea, that it might be practicable to propagate the disease by inoculation, after the manner of the small-pox; first, from the cow, and then from one human subject to another. The first case in which he put his theory to the test inspired him with confidence; and a regular series of experiments, which he afterwards instituted for that purpose, was crowned with success. Several persons were successively inoculated from each other with vaccine matter, and afterwards exposed, in a variety of ways, to the infection of the small-pox, which they all resisted.

This happy discovery was communicated to the world by Dr. Jenner, in a treatise published in June 1798, entitled, "An Inquiry into the Causes and Effects of the Variolæ Vaccinæ, a Disease discovered in some of the western Counties of England, particularly Gloucestershire, and known by the name of the Cow-pox." The result of his further experience was also brought forward in subsequent publications, in the course of the two succeeding years; and the whole work has been since republished in one volume. He has also written a small tract, entitled, "The Origin of Vaccine Inoculation;" from which the preceding account of this most singular improvement of the healing art, is, in a great measure, extracted.

It has been justly remarked, that the same fortune which has attended all other great discoveries, and all other great benefactors of mankind, attended Dr. Jenner on this occasion. Envy assailed his fame; his discovery was first depreciated, then denied; and as he surpassed Harvey himself in glory, so he also surpassed him in the opposition which he had to encounter. Truth, however, ultimately prevailed. Vaccination obtained a complete triumph; and the foes of Jenner and humanity were covered with confusion.

In July 1798, Mr. Cline inoculated a child with vaccine virus, received from Dr. Jenner; which succeeded. He afterwards put the child to the test of inoculation with small-pox matter in three places; which he resisted. On this occasion, Mr. Cline informs Dr. Jenner, that Dr. Lister, formerly physician of the Small-pox Hospital, and himself, are convinced of the efficacy of the cow-pox; and that the substitution of this mild disease for the small-pox, promises to be one of the greatest improvements ever made in medicine. He adds, the more I think on the subject, the more I am impressed with its importance. This instance of the *first* introduction of vaccine inoculation into the metropolis, it was necessary to mention; because another medical practitioner has laid claim to that honour. Attempts were made by Mr. Cline to continue the practice, by vaccinating other subjects with the virus thus produced; but they proved abortive; probably from the matter not being taken at an early period of the disease.

In November 1798, Dr. Pearson published his "Inquiry concerning the History of the Cow-pox, principally with a view

view to supersede and extinguish the Small-pox." In this work he brings forward the result of an extensive correspondence with medical practitioners, and others, in different parts of the kingdom; tending to confirm Dr. Jenner's opinion, that the cow-pox is a preventive of the small-pox. He had been informed of this discovery of Dr. Jenner by Mr. Hunter, nine years before; and had constantly mentioned the circumstance, in every course of his lectures, from that time. The fact had been mentioned in three publications: by Dr. Adams, in his "Treatise on Morbid Poisons;" in 1795, and by Dr. Woodville, in his "History of Inoculation," in 1796; having been communicated to them by Mr. Cline, and to him by Dr. Jenner. It had also been mentioned by Dr. Beddoes, in 1795, in his "Queries concerning Inoculation," in a letter from Mr. Rolph, who was acquainted with Dr. Jenner.

Information concerning the prophylactic property of the cow-pox had been given to sir George Baker, many years before, by his relation, the Rev. Herman Drew, of Abbots, in Dorsetshire, and several medical practitioners; but not gaining credit, it was never published. The same circumstance had also been noticed in a weekly paper, called "General Amusements," published at Gottingen in 1769. The author, whose name was not announced, speaking of the diseases said by Livy to be common to men and cattle, observes that the cow-pox prevails in the neighbourhood of Gottingen, and infects the milkers; and that those who have had the cow-pox, flatter themselves they are perfectly secure against the infection of the small-pox. He also tells us, he had made many inquiries, and was well assured by very respectable persons, that this opinion of the milkers was well-founded.

But the most ancient reference to the prophylactic power of this disorder on record, is probably that in "Ring's Treatise on the Cow-pox," p. 167. It is as follows: "Being desirous of knowing, whether there was any allusion to this disease in any ancient author, I wrote to Dr. Jenner on that subject; who favoured me with the following answer: "I know of no direct allusion to the disease, in any ancient author; yet the following seems not very distant to bear upon it. When the duchess of Cleveland was taunted by some of her companions, that she might soon have to deplore the loss of that beauty which was then her boast, the small-pox at that time raging in London, she replied, that she had no fears about the matter; for she had had a disorder, which would prevent her from ever catching the small-pox. This was lately communicated to me by a gentleman in this county; but unfortunately he could not recollect from what author he derived his intelligence."

In the Medical Journal for March 1799, it is stated, that the cow-pox had broken out at some farms in the environs of London, about the latter end of December; and that matter had been taken for inoculation. This alludes to the commencement of the practice of vaccination by Dr. Woodville.

In the same work for the ensuing month, is a letter from Dr. Pearson, dated March 12th, in which he states, that upwards of a hundred and sixty persons had been inoculated by Dr. Woodville and himself, separately; and that none of the patients had been considered to be dangerously ill. He also observes, that so many cases of the severe kind did not occur in this practice, as usually occur in the same number of cases of the inoculated small-pox; but he nevertheless acknowledges, that although many of these patients were less indisposed, yet "the whole amount of their constitutional illness seemed to be as great, as in the same num-

ber of patients in the inoculated small-pox." He also states, that "in many of the cases, eruptions on the body appeared; some of which could not be distinguished from the small-pox."

The next article in the same publication is a letter from Mr. Lawrence, a veterinary surgeon; in which he advises us not to be very sanguine in our hopes respecting this discovery; and expresses an opinion that the cow-pox will prove only a temporary preventive of the small-pox. Hence it is evident, that he has a right to dispute the palm of priority with Dr. Moseley, who confessedly advanced the same opinion before he knew any thing of the cow-pox; and with Mr. Birch, who, as well as Dr. Moseley, boasts that he was, for a long time, the only opponent of the practice. Be this as it may, Mr. Lawrence observes, that "some of Dr. Pearson's accounts make the cow-pox a more severe disease than the inoculated small-pox;" and that "if these accounts are to be depended on, the cow-pox has already had its day."

In one respect Mr. Lawrence has proved himself a much better prophet than either of the other gentlemen in question. He says, "whatever may be the fate of cow-pox inoculation, it has given, and will give occasion to a pretty large and open discussion; which is always beneficial, as having a tendency to produce discovery, and promote improvement; and when the public ardour for the present topic shall have become a little cool and satisfied, I hope it will be turned by enlightened men towards another, perhaps of nearly as great consequence, namely, *the prevention of the original malady in the animals themselves*. Those who have witnessed, or only reflected on, the excessive filth and nastiness, which must unavoidably mix with the milk in an infected dairy of cows, and the corrupt insalubrious state of their produce in consequence, will surely join with me in that sentiment." How well this hope has been realized, and this prediction fulfilled, is evident from Dr. Jenner's account, that the cow-pox is already become so rare in Gloucestershire, where it used to be so frequent; and from its never having re-appeared in the neighbourhood of London, since the farmers there have known its origin, now a period of nine years. This is no small proof of the rectitude of Dr. Jenner's opinion, that it originates from the greafe.

In the same number of the Journal, is a communication from Dr. John Sims, containing the case of Mr. Jacobs of Bristol; who is there stated to have had the cow-pox twice, and yet to have had the small-pox afterwards in so severe a manner, that his life was despaired of. This case has since been proved by Mr. Henry Jenner, and acknowledged by Dr. Sims to have been the spurious cow-pox; and Dr. Sims, who published the account of it from the most honourable motives, is so perfectly convinced of it, that he is become one of the most zealous advocates of vaccination.

He tells us, that Mr. Jacobs described the cow-pox which he had as the most loathsome of diseases; and observes, that Dr. Jenner had entirely overlooked this circumstance, although in itself so formidable an objection to the practice, even if it should be found to answer the purpose for which it was introduced. He also remarks, that it was impossible to know how far such a disorder might prove injurious to others, as well as to the individual who submitted to inoculation.

All these unfavourable accounts of the new species of inoculation deterred numbers of medical practitioners from adopting it. But perhaps no author sounded a louder alarm on this occasion than Dr. Moseley. This gentleman boasts of his having been the first who warned parents against vaccination; and he seems determined to persist in his

his opposition, in spite of any evidence that can possibly be advanced in its favour. Among the number of those who published adverse evidence, was also the celebrated Dr. Beddoes; the respectability of whose name added considerable weight to that side of the question. As a proof, however, that this gentleman was influenced in his conduct only by the most pure and upright motives, he has since voluntarily come forward as a zealous advocate of the practice, and pronounced the most flattering panegyric on Dr. Jenner.

Not so Dr. Moseley; he is so far from being convinced of the utility of vaccination, that he seems to be more and more exasperated against it, by every new account of its success. This, however, is not any great wonder, when he confesses that he wrote against it before he knew what it was; when he pretends that inoculation has disarmed the small-pox of its terrors; that accidents in the inoculated small-pox are uncommon, and that under proper treatment, it leaves nothing behind injurious to the constitution. After this, we cannot be surprised at his endeavouring to terrify parents with the idea of bestial humours; and of the ill consequences which may spring from that source, after a lapse of years.

A publication like this, although ill calculated to bear the test of criticism, was very well adapted to instil prejudices into the minds of the vulgar and ignorant; who are at all times averse from innovation in the practice of physic; and not yet reconciled to the idea of engrafting diseases. But whatever effect this publication might produce on vulgar minds, it produced much less effect on the minds of medical practitioners, and of all other learned and scientific men than some of the first reports of those, into whose hands vaccination, on its second introduction into the metropolis, happened to fall.

In addition to what is already stated, Dr. Woodville's work on this subject appeared soon after; in the dedication of which he informs sir Joseph Banks, that it *does not afford the satisfactory evidence which he expected*. It did not, indeed, afford the satisfactory evidence which others expected. Many people were of opinion, that in his account, he rather exaggerated the symptoms of those cases which had fallen under his care, in order to prevent vaccination from being established; as it tended to exterminate the small-pox, and to cut off the principal branch of his practice. This suspicion was perhaps natural when it was considered, that the cow-pox was represented by Dr. Jenner as a mild disorder, and by Dr. Woodville as a violent one; and that it was consistent with his interest to represent it as such. The truth is, that the physician of the Small-pox Hospital was the last man in the world who should have made the experiment of inoculating for the cow-pox; and the Small-pox Hospital the last place in which it ought to have been made.

By perusing Dr. Woodville's publication, any one may discover, that when he commenced vaccination, he commenced it not only in the most improper place, but also without any competent knowledge of the nature of the disease. He did not know whether it was pustular, or vesicular; general, or local; contagious, or not contagious. He also commenced it without any precaution; for he confesses, that many of his patients were in apartments where they were compelled to breathe a variolous atmosphere; and he even added to this danger of infecting them with the small-pox, that of inoculating them for the disease, at almost every period, while they were under vaccination! The consequences were such as might well be apprehended. Many of them had the small-pox at the same time with the

cow-pox. In a considerable number of cases, the cow-pox and small-pox matter were mixed together. in order to gratify curiosity, and see whether it was possible to create a new disease; but happily providence has set bounds to the power of doing mischief, and frustrated such attempts. In some instances one of those diseases is said to have prevailed, and in some the other; but in none of them was any hybrid disorder produced.

Dr. Woodville tells us he sent Dr. Jenner some of his cow-pox matter; which, at first, in some instances, occasioned a trifling eruption; probably the relics of the variolous matter, with which it had been contaminated by one of the circumstances already mentioned. He tells us, Dr. Jenner attributed the pustular eruption to some peculiar influence of the town air; but he informs us, that several of his patients, in whom these pustules appeared, were inoculated at the distance of eight miles from London; and that eighteen others, at a still greater distance, were inoculated with the same matter, in all of whom it produced a similar pustulous eruption. Nevertheless, he was so far from believing this eruption to be the small-pox, that he strenuously laboured to prove it was the cow-pox.

In one respect he is rather inconsistent with himself; for at page 145 he says, "the cow-pox, in every case which we are acquainted with, has been introduced into the human constitution through the medium of external local inflammation; and is therefore to be considered as an inoculated disease. The virus of it seems also to affect a similar mode of action, and to be governed by the same laws as that of the small-pox." But at page 153, after observing that the cow-pox is not infectious by effluvia, he says, "this is certainly true, when the disorder is confined to the inoculated part; but where it produces numerous pustules upon the body, the exhalations which they send forth are capable of infecting others in the same manner as the small-pox. Two instances of casual infection in this way have lately fallen under my observation. In one the disease was severe, and the eruption confluent; in the other the disease was mild, and the pustules few."

It must be allowed that Dr. Woodville, in some instances, excited the cow-pox; since he has given a very accurate description of it. He says, "if the inoculation be performed by a simple puncture, the consequent tumour, in the proportion of three times out of four, or more, assumes a form completely circular; and continues circumscribed, with its edges elevated and well defined, and its surface flat throughout every stage of the disease; while that which is produced from variolous matter either preserves a pustular form, or spreads along the skin, and becomes angulated and irregular, or disfigured with numerous vesicles."

"Another distinction, still more general and decisive, is to be drawn from the contents of the cow-pox tumour; for the fluid which it forms, unless from some accidental circumstance, very rarely becomes puriform; and the scab which succeeds is of a harder texture, exhibits a smoother surface, and differs in its colour from that which is formed by the concretion of pus." So far Dr. Woodville pursues the description of the cow-pox; but suddenly he loses sight of that object, and again relapses into his former error, in the following words: "All the appearances here described, however, do not constantly attend the disease; but are sometimes so much changed, that they can in no respect be distinguished, from those which arise from the inoculation of the small-pox. When the disease thus deviates from its usual appearance, at the inoculated part, its effects on the constitution have commonly, though not always, been felt more

more severely, than where the tumour was distinctly characterized."

Dr. Woodville acquaints us, that since his table was composed, an infant at the breast died on the eleventh day after the cow-pox matter had been inserted in its arm. In this case, he tells us, the local tumour was very inconsiderable; and the eruptive symptoms took place on the seventh day; when the child was attacked with fits of the spasmodic kind, which recurred at short intervals, with increased violence, and carried it off at the time above-mentioned, after an eruption of eighty or a hundred pustules."

Thus, he tells us, it appears, that out of about five hundred cases of the inoculated cow-pox, one proved fatal; while in the variolous inoculation, at the Small-pox Hospital, only one case proved fatal in six hundred. Many respectable members of the medical profession were deterred from vaccination by the foregoing statement; but it has since been proved that the child died of the small-pox.

Dr. Woodville indeed acknowledges, that vaccination in general produces much fewer pustules, and less indisposition, than the inoculation of the small-pox; but at the same time he contends, that in several instances, the cow-pox has proved a very severe disease; that in three or four cases out of five hundred, the patient had been in considerable danger, and that one child had actually died of the disorder. He confesses, that if one out of five hundred cases of cow-pox proved fatal, he should not be disposed to introduce the disease into the Inoculation Hospital; but that he is inclined to think, if matter for the vaccine inoculation were only taken from those in whom the disease appeared in a mild form, the result would be more favourable than in the statement which he had given. He says, it had occasionally happened, that matter taken from the arm of a patient, in whom the disorder neither produces fever nor eruptions, had in others produced both; yet it had much more commonly produced a milder disease, than matter taken from secondary pustules, or from a patient who had the disease in a severe manner.

He tells us, that out of sixty-two of his patients who were inoculated with the pustule matter, fifty-seven had an eruption; and that those who received the disease from any of these fifty-seven patients also had pustules in nearly the same proportion. He also informs us, that the disorder which proved fatal to one of his patients, was excited by matter of this description; that is, by matter of the *small-pox*. So far, however, was he from being aware of this, as to draw from these cases the following inference; that the cow-pock, from certain circumstances, is not only liable to lose the characters which distinguish it from the small-pox, but also to continue to propagate itself under this new and casual modification. From these erroneous premises he, therefore, draws a conclusion equally erroneous, that the small-pox and the cow-pock ought to be considered only as varieties of the same disease.

In the London Medical Review for August 1799, p. 626, Dr. Pearson expresses an opinion, that the pustules resembling the small-pox, which occurred at that time in vaccination, afforded matter, which, he believed, in some cases, produced the cow-pock in its usual mild way. This opinion, however, is not supported by any proof, and is now perfectly exploded.

In the Medical Journal for the same month, Mr. Ring published a defence of vaccination, in answer to Dr. Moseley, in which he brings forward evidence to prove, that it is much milder and safer than it had hitherto been represented to be by some London practitioners, and affirms that the success of it had, on the whole, been such as to gratify

every reasonable expectation. He also cautions medical men not to take matter for inoculation from any but an original pustule; and not to make useless experiments, or wantonly expose the lives of their fellow-creatures to unnecessary danger, by inoculating them with one kind of matter, before another had produced its final effect. This caution, unfortunately, has been too often disregarded.

He also advanced an opinion, which he has since fully confirmed in his treatise on the Cow-pox, that two morbid actions may take place in the body at the same time, notwithstanding the contrary had been maintained by Mr. John Hunter, and was considered in the schools of medicine as an unquestionable doctrine.

About the same period, Dr. Jenner published the second part of his work, entitled "Further Observations on the Variolæ Vaccinæ;" in which he tells us, that soon after the publication of the former part of his work, he clearly perceived that his theory, which promised to be so beneficial to mankind, was likely to fall into disrepute, owing to hasty conclusions. He therefore requests medical practitioners to be a little more careful in their observations, and the public to suspend their judgment till they had more ample information.

In the course of the following year, he republished these two parts of his work, together with a third, in which he says, he has the pleasure of seeing the feeble efforts of a few individuals to depreciate the practice, sinking fast into contempt.

He there observes, that upwards of six thousand persons had then been vaccinated, and that the far greater part of them had since been inoculated for the small-pox, and exposed to the infection of the disorder in every rational way that could be devised, but to no purpose.

He then alludes to the experiments of Dr. Woodville, the result of which, he observes, essentially differed from his own in a point of much importance, three-fifths of Dr. Woodville's patients having had eruptions resembling those of the small-pox. These Dr. Jenner could not ascribe to the insertion of vaccine virus, when he considered, that in his own neighbourhood, out of the great number of casual and other cases which he had seen and heard of, although the matter was derived from different sources, nothing like a variolous pustule had ever appeared. He therefore justly concluded, that those which had occurred in the practice of Dr. Woodville, and of others to whom Dr. Woodville had given matter, were occasioned by the *variolous* matter with which he had inoculated his vaccine patients, on the third or fifth day after vaccination.

In the Supplement to the Encyclopædia Britannica, under the article VARIOLÆ VACCINÆ, or COW-POX, are some erroneous, if not mischievous, opinions, which ought to be corrected. Vaccination is there represented as a more severe process than what Dr. Jenner gave us reason to expect: an eruption exactly resembling the small-pox is stated to be a very common occurrence; and in some cases the febrile symptoms are said to be considerable and alarming. In one instance it is asserted that the disorder proved fatal. It is there also stated, on the authority of Dr. Woodville, that the cow-pox is sometimes infectious by effluvia, like the small-pox, and has a similar appearance on the arm.

Dr. Woodville has since acknowledged, that the infant whose case is above referred to, died of the small-pock, and not of the cow-pock; but as there are still some persons who endeavour to prove that the cow pock is an eruptive disease, it is necessary to enter a little further into the investigation of this point.

In the same article of the Supplement to the Encyclopædia,

dia, as well as in other publications, we are told, that from the occurrence of such pustulous eruptions, in the practice of Dr. Woodville and others, Dr. Pearson draws the following conclusions; that in certain constitutions, or under the circumstances of certain co-operating agents, *the vaccine poison produces a disease resembling the small-pox*, and of course the pustule in the inoculated part is *very different from that of the vaccine-pox ordinarily occurring*, and the eruptions *resemble very much, if not exactly, some varieties of the small-pox*; that in some instances these eruptions had occurred, although the inoculated part had exhibited the genuine vaccine pustule; that the matter of such eruptive cow-pocks, whether taken from the inoculated part, or from others, universally, or at least generally, produces similar eruptive cases, and has not, as Dr. Pearson believes, been seen to go back, by passing through different constitutions, to the state in which it produces what is called the genuine vaccine disease.

In the same article it is stated, that Dr. Woodville says, if the inoculated part assumes a pustular form, though it continues only *one or two* days, the inoculation is as effectual as where it proceeds through its regular course. This, as well as the former opinion, being founded in error, the more widely it is diffused, the more necessary it is to correct it. One instance, proving its fallacy, may be seen in the Medical Journal for February, 1801, in a letter from Dr. Harrison to Sir Joseph Banks; and many others in the various authors who have written on vaccination.

Here it may not be superfluous to remark, that the term *pustule*, however common, is not expressive of the cow-pock, which is a *vesicle*, of a cellular construction.

With regard to the other opinion advanced in the Encyclopædia, namely, Dr. Pearson's, that in certain constitutions, and under certain circumstances, cow-pock matter is capable of producing a disease resembling the small-pox,—it is proper to lay before the reader such arguments and facts as may enable him to form his own judgment.

In the London Medical Review for April, 1800, Mr. Blair called the attention of the faculty to an examination of this question, and contended, that either the matter used in these inoculations was contaminated, or the cow-pox is a pustulous disease, and capable of communicating infection by effluvia. That conclusion he founded on two cases which occurred in the practice of Mr. Ring, and which Mr. Ring had related to the Medical Society. With matter taken from one of these patients Mr. Blair inoculated a child, and produced a pustular disorder, which, like the former, was not distinguishable from the small-pox, and, like the small-pox, proved infectious by effluvia; for another child in the same apartment caught the disease!

The matter which occasioned this eruptive disorder, was obtained by Mr. Ring from Dr. Pearson, and by him from Dr. Woodville; and this event furnishes one proof, out of many, of the melancholy effects of practising vaccine inoculation at the Small-pox Hospital. In the Medical Review for May, 1800, Mr. Ring observes, that the appearance of a considerable eruption, in the two cases referred to by Mr. Blair, occasioned a variety of conjectures at the time; but no one who had seen much of the practice with genuine cow-pock virus, could then possibly entertain a doubt that the matter was variolated by some means or other. Whether this contamination took its rise from a variolated lancet, or a variolated atmosphere, he does not pretend to determine, not having seen the matter, nor the lancets, till the moment when inoculation was about to be performed.

He then states, that for the space of six months he had used matter from the stock of Dr. Jenner, which had not produced pustulous eruptions, and quotes an extract of a

letter from Dr. Jenner, to prove that the cow-pock is not infectious by effluvia; adding, that even the casual disease, when most severe, has never been suspected to be capable of infecting any person, except by contact!

In the Medical Review for June, 1800, Mr. Ring states, that the opinion which he had ventured to advance in the Medical Journal for August, 1799, in opposition to the hypothesis of Mr. Hunter, and other celebrated physiologists, that two morbid actions in the same subject, at the same time, are incompatible, was then confirmed by two additional cases, published by Dr. Tracey in the New York Medical Repository; and also by a case of co-existence of the cow-pock and measles, which had lately occurred in his own practice. In this case, which he shewed to Dr. Jenner, Dr. Marshall, and other medical practitioners, the measles appeared on the eighth day of vaccination; yet the cow-pock was neither superseded nor retarded by that disease. This, and many other instances of the co-existence of eruptive disorders, which he has related in his treatise on the Cow-pox, corroborate the opinion, that the pustular eruptions in patients under vaccination at the Small-pox Hospital and elsewhere, owed their origin to the small-pox and not to the cow-pox.

In the Medical Review for July, 1800, he published some additional observations on this subject, in which he states, that he had lately seen three instances of the small-pox, in consequence of the insertion of matter obtained from the Small-pox Hospital as cow-pock matter. In the same letter he expressed his surprise, that Dr. Woodville was not yet convinced of his error. Dr. Woodville having advanced an opinion, that in those places where *the small-pox* is epidemic *the cow-pox* produces pustules, Mr. Ring observes, that where the small-pox prevails, it is more reasonable to ascribe these eruptions to the action of variolous matter, than to say, that where *the small-pox* prevails, *the cow-pox* produces pustules.

In the same publication for September, he inserted some further remarks on the same subject, in which he states, that he had since known several instances in which the small-pox was excited, instead of the cow-pock, by supposed vaccine matter procured from the Small-pox Hospital, and from Dr. Woodville; and expresses his doubt whether it was of advantage to the public, that any species of inoculation should still be practised at the Small-pox Hospital. He adds, “for my own part, I must confess, that however useful it has heretofore been in this respect, its utility ceased on the introduction of the new practice by Dr. Jenner. Either that Augæan stable ought to be cleansed, or to serve as a mere pest-house for the reception of such as are seized with the natural small-pox. It was not designed to propagate that disease, nor to disseminate a deadly poison.”

In the same paper he asserts, that when persons already infected with the small-pox are vaccinated, the cow-pock sometimes appears to mitigate, and at others to supersede the small-pox; but that this rule was not without an exception, on which account he thought much greater caution necessary in the practice of vaccine inoculation than had hitherto been observed.

In his treatise on the cow-pock, he has given a full detail of the rise and progress of vaccination in the metropolis, and an analysis of Dr. Woodville's publications; proving that the disorder which had created so much alarm, and so greatly retarded the progress of the new inoculation, was, in reality, not the cow-pock, but the *small-pox*!

§ 3. *The comparative Advantages of Vaccination.*

The following comparative statement of the advantages of

of the new practice is, in a great measure, taken from Ring's Compendium of Vaccination.

The natural small-pox is a loathsome, infectious, painful, and fatal disease. It is confined to no climate; but rages in every quarter of the world, and destroys a tenth part of mankind. Those who survive the ravages of that dreadful distemper, often survive only to be the victims of other maladies; or to drag out a miserable existence worse than death. This cruel and lamentable disorder leaves behind it pits, scars, and other blemishes; and bodily deformities which embitter life.

The inoculated small-pox also is loathsome, infectious, painful, and sometimes fatal; and when partially adopted, spreads the contagion, and increases the mortality of the disease. It sometimes occasions the same maladies as the natural small-pox. It frequently leaves behind it the same blemishes and deformities as the natural small-pox; which are the more deplorable, as they were brought on by a voluntary act.

The inoculated cow-pock scarcely deserves the name of a disease. It is not infectious; and, in the opinion of the most experienced practitioners, has never proved fatal. It occasions no other disease. On the contrary, it has often been known to improve health; and to remedy those diseases under which the patient before laboured. It leaves behind no blemish, but a blessing—one of the greatest ever bestowed on man—a security against the future infection of the small-pox.

§ 4. *The Manner of taking and inserting Cow-pock Matter.*

The following instructions for the practice are also taken from Ring's Compendium. Cow-pock matter may be taken at any period, from the first appearance of the vesicle, till the areola begins to form, by small punctures; allowing it time to flow; or promoting the discharge by gentle pressure with the lancet. It must be taken with great caution; otherwise the intention of the inoculator may be frustrated, or violent inflammation and ulceration of the arm may ensue.

The cow-pock matter is to be inserted, by a superficial puncture, into the middle of the arm, between the shoulder and the elbow; or, when the arm is likely to be much used, into the inside of the leg. Fluid matter is preferable to dry; but those inoculators who have not a constant succession of patients, and cannot readily procure a fresh supply of matter, should preserve it on vaccinators for future occasions. In this manner, when kept in a cool place, it may be preserved several months.

§ 5. *The Manner of preserving Cow-pock Matter.*

Cow-pock matter may be preserved, and conveyed, on the point of a vaccinator; that is, a bit of ivory, shaped like the tooth of a comb, and pointed like a lancet.

When the matter is intended to be sent to a distant place, or to be kept long, the vaccinator should be changed several times. It should not be dried before the fire; and, when suffered to dry on a lancet, should not be kept above two or three days. When dry matter is used, it should not be moistened previously to insertion; but the longer it has been kept, the longer the point of the instrument ought to remain under the cuticle, that it may have time to dissolve. When fluid matter is used, the lancet should be washed in cold water, and wiped dry after every puncture.

Various other methods have been contrived for the preservation and conveyance of cow-pock matter; but the ivory lancet, invented by Dr. de Carro, and the vaccinator above-described, invented by Mr. Ring, which is generally considered an improvement of it, being much cheaper and more

portable, are now commonly preferred. When vaccinators are to be sent to a moderate distance, they may be wrapped in paper; but when they are to be sent to a great distance, they may be inclosed in a quill, to be stopped with white wax. Sealing wax is not proper for this purpose; because it cannot be employed without heat, which is extremely prejudicial to the matter. When a vaccinator is to be used for inoculation, a small oblique puncture is first to be made with a lancet; then the point of the vaccinator is to be inserted, and held in the puncture some time, and afterwards repeatedly wiped on the part; in order to insure, if possible, the lodgment of the matter.

General Observations on the Practice.

One cow-pock is generally supposed to be a security against the future infection of the small-pox; but when the patient resides at a distance, or is in danger of catching the small-pox, it is proper to inoculate in both arms. Another reason for inoculating in both arms is, that a more copious supply of matter is thus afforded for future inoculation.

Those who have been exposed to the infection of the small-pox, ought to be inoculated with the cow-pock; which seldom fails to supersede, or mitigate, the small-pox.

§ 6. *The local Symptoms of Vaccine Inoculation.*

On the third day, the day of inoculation being reckoned the first, a red spot commonly appears; and, on the fourth or fifth, a cellular vesicle, of a light pink, sometimes with a blueish tint, gradually changing into a pearl colour. The margin is elevated, the centre depressed, the contents are limpid. It increases till the tenth day.

About the ninth, the inflammation surrounding the base spreads rapidly, and forms a circumscribed areola, which, in a day or two, commonly begins to fade. When the areola is complete, the vesicle soon begins to decline. First, it turns brown in the centre; it is then gradually converted into a hard, smooth, shining scab, of a dark mahogany colour, approaching to black; which falls off about the end of the third week, leaving a scar, which is generally round and circumscribed, and some degree of indentation.

§ 7. *Spurious Pustules.*

A spurious pustule is more elevated and opaque than the genuine; and more rapid in its progress. It is not cellular; nor surrounded with a distinct circumscribed areola; nor converted into a dark shining scab. Spurious pustules often occur in those who are vaccinated after having had the small-pox. They are sometimes also produced in those who have not had the small-pox, by blunt or rusty lancets, by matter taken from a spurious pustule, or from a genuine pustule at too late a period; or by that which has been kept too long, or dried before the fire. When there is any irregularity, or doubt of success, the patient ought to be inoculated again.

§ 8. *The constitutional Symptoms.*

Sometimes a drowsiness appears on the second or third day of vaccination. Febrile symptoms also sometimes commence early; but more frequently about the eighth day. They are commonly slight and transient. In many cases there is no apparent constitutional indisposition; yet the patients are rendered secure from the future infection of the small-pox.

The superiority of vaccine inoculation being now fully ascertained, some restriction ought to be imposed on the inoculation of the small-pox; and those mercenary practitioners who prefer their own private interest to that of the

public, should no longer be suffered to disseminate a malignant poison, or to scatter the seeds of death with impunity.

§ 9. *Prejudices against Vaccination.*

The prejudices against vaccination are similar to those which formerly prevailed against the inoculation of the small-pox. They proceed partly from ignorance; but self-interest has also a considerable share in exciting them, as is too evident in the conduct of certain individuals, who wish to profit by the credulity of the public, and to enrich themselves by the inoculation of the small-pox.

One of the prejudices against vaccination is, that it produces other diseases; another, that it is no security against the future infection of the small-pox. With respect to the first, it may perhaps be sufficient to observe, that no such diseases are produced by the cow-pox in the casual way, though much more severe than under inoculation, nor in the children of persons in a respectable situation of life. Those which are ascribed to this cause occur chiefly in the children of the lower class; and are occasioned by want of care, and of cleanliness or other causes to which the poor are, in all countries, in some measure, unavoidably exposed.

These disorders, which used to be concealed as much as possible by parents, and other parties concerned, have lately been dragged into light; and accounts of them have been circulated with great industry, and with the most shameful exaggeration and misrepresentation. It has, however, been proved, that they are less frequent than they were before vaccination was introduced into practice; and that even in Gloucestershire, where the natural cow-pox has been most known; and best understood, no person has ever applied to the Infirmary for any disease, supposed to be occasioned by the cow-pox.

We shall conclude this article with an extract from the Report of the Royal Jennerian Society for the Extirpation of the Small-pox, dated October 1, 1807.

"The Directors congratulate the public on the very favourable opinion which the Royal College of Physicians of London, after a most minute and laborious investigation, made by command of his majesty, have a second time expressed on the subject of vaccination, in their Report laid before the house of commons, in the last session of parliament; in consequence of which the sum of twenty thousand pounds was voted to Dr. Jenner, as a remuneration for his discovery, in addition to ten thousand pounds before granted.

"In this Report, the college of physicians, after premising that they advance nothing but what is supported by multiplied and unequivocal evidence, assert, that the testimonies before them are decided in declaring, that the cow-pox is much milder, safer, and much less apt to cause other diseases than the small-pox: that the monstrous diseases attributed to vaccination, are either the inventions of designing, or the mistakes of ignorant, men; and that the prints and publications which have been so widely circulated, in order to alarm timorous and uninformed parents, originate either in gross ignorance or wilful misrepresentation.

"They are also of opinion, that if due encouragement were given to vaccination,—if the public were fully informed of its advantages, and the benefits of this salutary operation were every where offered to the poor free of expence, it would in time supersede the inoculation of the small-pox. One particular advantage of the cow-pox is, that it protects those individuals who submit to the operation, without endangering the health of the community at large; whereas the inoculation of the small-pox keeps up a continual source of contagion, and increases the fatality of the disease."

In fine, the college of physicians declare, "that they feel it their duty strongly to recommend the practice of vaccination; that they have been led to this conclusion by no preconceived opinion, but by the most unbiassed judgment, formed from an irresistible weight of evidence which has been laid before them; and that when the number, the respectability, the disinterestedness, and the extensive experience of its advocates, are compared with the feeble and imperfect testimonies of its few opposers,—and when it is considered that many who were once adverse to vaccination have been convinced by further trials, and are now to be ranked among its warmest supporters, the truth seems to be established as firmly as the nature of such a question admits; so that the College of Physicians conceive that the public may reasonably look forward with some degree of hope to the time when all opposition shall cease, and the general concurrence of mankind shall at length be able to put an end to the ravages, at least, if not to the existence of the small-pox."

"It is highly satisfactory to observe, that these opinions of the royal college of physicians of London are supported by the concurrent testimony of the other colleges of physicians and surgeons in the United Kingdom.

"The Royal Jennerian Society, aware of the necessity of using their utmost exertions for accomplishing the great object of their institution, continue to offer gratuitous vaccination to all descriptions of persons, at their Central-house, No. 14, Salisbury-square, Fleet-street, and at their other stations in different parts of the metropolis: as well as to afford their utmost assistance in extending its benefits, by the distribution of vaccine matter, with proper instructions, and by all other means in their power; and, they trust, a generous public will enable them further to promote a practice, which is so essential to the prosperity of the British empire, and to the welfare and happiness of mankind."

We refer those who wish for further information on this important subject, to Dr. Jenner's Inquiry into the Causes and Effects of the Variolæ Vaccinæ, or Cow-pox; Dr. Pearson's Inquiry concerning the History of the Cow-pox; Dr. Woodville's Reports on Vaccine Inoculation; Dr. Willan on Vaccine Inoculation; the Evidence at large, by the Rev. George Jenner; Practical Observations on the Inoculation of the Cow-pox, by Mr. Bryce, member of the Royal College of Surgeons of Edinburgh; the London Medical Review; the Medical and Physical Journal. Also, A Treatise on the Cow-pox, 2 vols. with plates; a Compendium of Vaccination; an Answer to Mr. Goldson; an Answer to Dr. Moseley; an Answer to Mr. Birch; and A Rowland for an Oliver, containing an Answer to Dr. Moseley and Mr. Birch, by Mr. Ring, member of the Royal College of Surgeons of London, to whom we are indebted for this article.

~~COWRING, in *Falconry*, the quivering of young hawks, who shake their wings, in sign of obedience to the old ones.~~

~~COWRY, or KOWRY, in *Commerce*, a small shell used in Hindoostan, particularly at Calcutta, as a small coin, and brought from the Maldives in exchange for rice. Cowries are also used as current coin in Africa. It is said that about 100 tons of cowries are annually shipped from England alone to Guinea. These are originally imported from the Maldivé islands to Bengal, and from Bengal into England. In Bengal 80 cowries make a *poni*, and 60 or 65 ponies, as there are few or many cowries in the country, make a rupee. There is, however, a great variation in the value of cowries in Bengal. Ricaud says, that 2500 make a rupee; Bolts says, 4000 to 4800 are of the same value; and Stavorinus makes a rupee equal to 4800, and as high~~

colmars, and winter bonchrétiens, which keep much longer than beurrés, crânes, &c."

But for standards that have been grafted in the spring and have mislaid, he advises that they should be cut below the graft, as, when so treated, they throw out a great number of shoots, which should by no means be too soon thinned, as in that case they will be liable to be broken by the wind. The weakest shoots may be begun to be taken off about the latter end of May or beginning of June. About the middle of the latter month they will have acquired considerable strength, then thin them, leaving as many strong regular shoots, and of those nearest the top of the stem, as will form a handsome head. If the stem be very strong, it will be necessary, perhaps, to leave more than are intended to be inoculated on purpose to receive the sap, which will flow in great abundance from a large trunk, and without this precaution be apt to burst the shoots. He has often seen shoots as large as his arm burst by a superabundance of sap. When that is likely to happen, the best thing is to scarify the shoots and rub a little of the composition into the wound. See BUD, BUDDING, and GRAFTING.

INOCULATION, among *Gardeners*, signifies an operation in the management of some sorts of fruit-trees, which is frequently denominated *budding*. See BUDDING, and the preceding article.

INOCULATION, in a *surgical and medical* sense, denotes the practice of designedly communicating from one person to another certain diseases, which is generally done by introducing some of the infectious matter into a small wound, or puncture, made with the point of a lancet. The common purpose of such operation is to diminish the severity and peril of a distemper, which, taken in a casual way, proves exceedingly destructive, and the hazard of catching which, at some period of life or another, is very considerable. A chief object of the plan is also, in general, to render the patient incapable of being again affected by the dreaded contagion. Hence inoculation is seldom performed, but for a disease with which the human constitution can only be affected once, as the small-pox and cow-pox. The latter, which is so mild as scarcely to deserve the name of a disease, being only communicable by contact, and existing originally no where except upon the teats and udders of cows, would never perhaps have troubled any other persons than a few milkers, had it not been for the discovery of the important fact, that persons who had undergone the complaint were made completely unsusceptible of the small-pox contagion. The cow-pox inoculation has now, therefore, been very generally substituted for that with variolous matter, and the beneficial consequences of this change are so truly important that the Jennerian discovery will ever be regarded as a most memorable event, not only in the annals of medicine and surgery, but in the history of the world. See COW-POX and VACCINATION.

Although it is our intention to devote this article to the history of the small-pox inoculation, we may here remark, that the measles have been propagated by inoculation. Dr. Home, of Edinburgh, was the first who actually made the experiment. Not being able to collect either matter, or a sufficient quantity of broken cuticle at the time of desquamation, to produce the disease, he drew blood from a superficial cutaneous vein, where the eruption was thickest. Cotton was then dipped in this blood, and applied to a wound made in each arm of the person about to be inoculated. In this manner Dr. Home inoculated twelve persons. The eruptive fever generally began six days after inoculation; the symptoms were less severe; the cough was milder, or entirely absent; and the inflammation of the eyes was trifling.

Notwithstanding Dr. Home's success, inoculation for the measles is seldom or never practised, others, who have made the experiment, not having given reports equally favourable.

Inoculation for the plague has likewise been tried, in order to ascertain whether that distemper might not be rendered less fatal and less prevalent in particular parts of the world. In Egypt, Dr. Whyte inoculated himself with matter taken from the buboes of an infected person. The attempt failed twice; and the third proved fatal in three days after the commencement of the symptoms. See Sir R. Wilson's Hist. of the Expedition to Egypt.

In the present state of our information, inoculation for the plague appears unjustifiable. It was ascertained in Egypt, that many of the convalescents took the plague a second time; nor, in all probability, does inoculation render this distemper milder. Indeed, what M. Sonnini observes, seems to lead to a contrary conclusion; for he mentions, that a Russian surgeon, who was a prisoner at Constantinople, with a number of his countrymen, took it into his head to inoculate these unfortunate men with the plague, under the idea of rendering the contagion less destructive; but the result was, that two hundred lost their lives, as well as the surgeon, who had also inoculated himself. See Sonnini's Travels into Greece and Turkey, p. 497.

The idea of intentionally imparting any kind of disease to the human body would appear, to persons unacquainted with the reason of the thing, equally extraordinary and cruel. But the design and utility of the inoculation for the small-pox are now so fully known among all classes of society, as scarcely to need explanation. When it is remembered, that the small-pox contagion has, at various periods, nearly depopulated extensive kingdoms, and occasioned greater devastation than the most destructive wars, any measure, calculated to render milder so terrible a disease, must be looked upon as a discovery of the very highest importance. It has been estimated, that, upon an average, before the introduction of inoculation, one out of every six persons affected with the natural small-pox, or sometimes even a half, perished; but that the proportion of deaths, among such as have been inoculated in the most improved manner, does not amount to more than one in several hundreds. Besides this circumstance, we have to mention, that before inoculation became common, the small-pox frequently committed ravages like the plague, and the fury of the distemper was always dreadful whenever the contagion made its first visit to a country. If, then, we are to hail the small-pox inoculation as a general and momentous benefit to society, on the principles just now specified, with what joy and admiration must we behold the discovery of a complete security against the small-pox infection, in the new and perfectly safe kind of inoculation with vaccine lymph. The small-pox inoculation materially alleviated the calamities arising from that contagion, by making the disease milder, and lessening its mortality. But, still, the distemper was not unfrequently seen in a severe form; at least one out of every three or four hundred inoculated died; and the countenances of those who survived were often miserably pitted and disfigured. On the other hand, the vaccine inoculation hardly ever produces any serious indisposition, and being followed by no eruption, cannot deform the face. Its safety and efficacy are daily receiving more and more confirmation from all quarters of the world, and we have no doubt that, after prejudices have had time to subside, the small-pox inoculation will be universally superseded.

The original introduction of inoculation, however, will always constitute a most memorable event in history, and is a subject.

INOCULATION.

a subject too interesting to be omitted in our work. After a few observations on the commencement of the small-pox, we shall therefore endeavour to give some account of the rise and progress of the practice.

Origin of the Small-pox.—The small-pox, like the measles, and several other diseases, is produced by a matter *sui generis*, or, in other words, by a specific contagion, and it has originated from causes so perfectly incomprehensible, as to set at defiance all rational conjecture. From the silence of the ancient Greeks and Romans respecting a disease so very fatal, and of such peculiarity, as the small-pox, it is reasonable to conclude, that its date is subsequent to their times, and, consequently, that the world existed several thousand years before it was visited by this dreadful pestilence. Rhazes, an Arabian physician, who practised at Bagdad in the beginning of the tenth century, is one of the oldest writers on the small-pox, whose works are still extant. On this subject, however, he quotes several of his predecessors, the most ancient of whom is Ahron, who was a priest and physician at Alexandria, when that city was besieged by the Saracens. Ahron's book has, therefore, been deemed the first in which any notice is taken of the small-pox. The introduction of the disease, at that time, into Egypt, might have been by the armies of Amrou, which, in the kaliphate of Omar, poured in thither from Arabia.

The celebrated Dr. Friend conceived, that the Arabians might originally have derived the contagion from some of the more distant regions of the East, and Père D'Entrecolles, a missionary jesuit at Pekin, informs us, that, upon looking over some Chinese books, he found the small pox mentioned in them as a disease known in very ancient times. See "Lettres edifiantes et curieuses," tom. 21. p. 33. ed. 1781.

Mr. Holwell, a Bengal surgeon, has likewise endeavoured to confirm the accuracy of Dr. Friend's opinion, observing, that, "at the period in which the Aughtorrah Bhade scriptures of the Gentoos were promulged, (according to the Bramins 3366 years ago,) this disease must then have been of some standing, as those scriptures institute a form of divine worship, with poojahs, or offerings, to a female divinity, styled by the common people Goote ka Tagooran, the Goddess of Spots, whose aid and patronage are invoked during the continuance of the small-pox season; also in the measles, and every cutaneous eruption that is in the smallest degree epidemical. See "An Account of the Manner of inoculating the Small-pox in the East Indies," p. 7.

On the other hand, Dr. Woodville is unwilling to admit, that the supposed antiquity of the small-pox in India is at all proved by what D'Entrecolles and Mr. Holwell have observed. He remarks, that the former has adduced no direct fact, shewing, that the disease was really described by the ancient Chinese physicians; while Mr. Holwell's reasons must be inconclusive, not only as founded on the verity of the Hindoo chronology; but because the Goddess of Spots was not supposed to preside over any particular eruptive disorder, but over all cutaneous affections that were epidemical. Besides, as Dr. Woodville justly notices, had the small-pox existed in India more than 3366 years, it could not fail to have been transported in early times both to the Greeks and Romans, by the constant intercourse, which they indirectly maintained with the Indian nations.

Dr. John James Reiske mentions, that, in an old Arabic MS. preserved in the public library at Leyden, he read, that, in the year of the birth of Mahomet, the measles and small-pox made their first appearance in Arabia. Disp. inaug. Lugd. Bat. 1746. Now it appears also from some Arabian

annals, procured by that adventurous traveller, Mr. Bruce, that the era of the first appearance of the small-pox in Arabia attaches to that of the siege of Mecca, and that the Abyssinian army, commanded by Abrahah, was the first victim of its fury. Mr. Gibbon states, that the siege of Mecca happened only two months before the birth of Mahomet; a fact, which Dr. Woodville points out as deserving very particular notice; for if the year of the birth of Mahomet be ascertained to be also that of the siege of Mecca, the Arabian MS. cited by Dr. Reiske, and that written by Hamefy, the Arabian author mentioned by Mr. Bruce, perfectly coincide. According to Gibbon, Mahomet was born A.D. 569; which, on the above independent authorities, is to be considered as the period when the small-pox first made its appearance in Arabia.

From this era, to that of the conquest of Alexandria in 640, no traces of the existence of the small-pox are to be discovered; but the disease certainly spread into that city at the time it was invaded by the Saracens; and, as Dr. Woodville states, it may therefore be supposed to have been brought into Egypt by the Mahometan army, which, six years before, had invaded Persia and Syria, where this destructive pestilence probably had already made a considerable progress.

After this period, to the revival of literature in the 15th century, succeeded that general state of ignorance and barbarism, during which the present subject, in common with many others, is so obscured in the darkness of the times as to elude the most diligent research.

It is manifest from the works of Rhazes, that many of the Arabian physicians had written on the small-pox before the 10th century; and notwithstanding the Saracen history is silent on the ravages which must have accompanied the general diffusion of the small-pox during the empire of the caliphs, the progress and prevalence of the distemper are to be inferred from collateral evidence. Thus, the caliph Yezid, who died in 683, is mentioned as being pitted with the small-pox; and the caliph Abul-Abbas Alfassah actually died, in 753, of this disease.

The time when the small-pox contagion first spread into Great Britain is involved in doubt. Most writers suppose that the distemper was imported into Europe by the crusaders, upon their return from the Holy Land in the 13th century. The improbability of this statement is insisted upon by Dr. Woodville, who adverts to the known activity of variolous matter, the long time it retains its infectious quality, and the unlikely circumstance of the small-pox prevailing six or seven centuries over various parts of Asia, having free intercourse with Europe, before it was conveyed into this kingdom. It is indeed surprising, that the dreadful effects which must have attended the first introduction of the small-pox into this as well as any other country, have escaped the notice of all our historians and medical writers. But, by examining some of the MSS. of the Harleian and Cottonian collections, preserved in the British Museum, and bearing indubitable evidence of having been written before the year 900, Dr. Woodville succeeded in tracing the existence of the small-pox in our island, and on the neighbouring continent, long before the crusades took place. In these curious records the word *variola* occurs several times in the same sense in which it is now used. We likewise learn from the MSS. that the people in those early times lived in continual dread of the small-pox, as several prayers, exorcisms, and incantations, to which they had recourse for preservation, are to be found. Dr. Woodville refers us to No. 585, of the Harleian Catal. vol. i, and Bibl. Cotton. Caligula A. 15. No. 30.

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The first British medical writers of any note were those of the 13th century, and they, as well as all their successors, from John of Gaddesden to the immortal Sydenham, &c. have bestowed much attention on this important distemper.

History of Inoculation of the Small-pox.—The exact part of the world where inoculation was first adopted is quite unknown; nor do we possess any information of the circumstances which originally suggested the benefit that might result from the practice. From the Arabian physicians having been the first informed of the nature and treatment of the small-pox, it has been supposed that inoculation had its origin among them. (See Second Memoire sur l'Inoculation par M. de la Condamine.) Avicenna, who lived at Bokhara on the east coast of the Caspian sea, or his disciples, have in particular been suspected of being the authors of this valuable invention, in consequence of the countries between the Caspian and Euxine seas being the supposed centre from which inoculation spread to other places. Dr. Woodville, however, considers this conjecture as very ill-founded. He contends that we have no evidence that any of the people near the Caspian sea were the first practisers of inoculation. Had the invention originated in this part of the world, the Tartars could hardly have been so ignorant of the practice, as, according to D'Entrecolles, they actually were in the year 1724. Nor is it probable that the method spread from west to east; for as the same author has observed, inoculation is more ancient in the eastern parts of China than it is in the western provinces of that empire. Dr. Woodville remarks that inoculation was certainly first introduced into Constantinople from the Morea; but as the event did not take place till towards the end of the 17th century, we may conclude, that, had the art been practised for many ages, at so short a distance from that metropolis, it would have been known there much sooner. Besides, in various countries, very remote from the Caspian sea, it is proved to have been an immemorial usage.

Inoculation was introduced into London as a foreign invention, and, from its success upon the younger branches of the royal family in 1722, became the subject of public conversation, when, to the great surprise of the learned, several communications proved that it was already a practice known in South Wales, where it had existed under the denomination of buying the small-pox as far back as tradition could be traced. The manner of inoculating, or buying the small-pox, here alluded to, was subject to variety. Some persons either rubbed the matter, taken from the pustules, when ripe, on several parts of the skin of the arms, &c. or pricked such parts with pins, or other pointed things, first infected with the same matter. Some scraped the skin with a knife, until the blood began to flow, before they applied the variolous pus. Others produced the distemper by holding a certain number of dried pustules, for a considerable time, in the palm of the hand. (See the Letters of Dr. Williams, Mr. Owen, and Mr. Wright, in the Philosophical Transactions for 1722, and Dr Jurin's account of the success of inoculation in 1723.) The inhabitants of the Highlands of Scotland have also for many ages performed a kind of inoculation by tying worsted threads, moistened with variolous matter, round the wrists of their children. (Monro on Inoculation in Scotland.) The same custom likewise prevailed in many other parts of Europe, Asia, and Africa; and, what is highly curious, the practice was, in several of these distant countries, termed *buying the small-pox*, just as it was in South Wales; for it was superstitiously imagined that inoculation would not produce the proper effect, unless the person from whom the variolous matter was taken received a piece of money, or

some other present, in exchange. The practice of buying the small-pox has been found to have prevailed from time immemorial, not only in South Wales, but also at Naples, Pavia, in Auvergne and Perigord, and among the peasantry in many parts of Germany, Denmark, and Sweden. See Second Mem. sur l'Inoculation, par M. de la Condamine; Murray's *Historia Infectionis Variolarum in Suecia*; Schultz's *Account of Inoculation*, &c.

In Barbary and the Levant the variolous matter was also purchased, and inserted in a small incision made in the fleshy part of the hand between the thumb and the fore-finger. (See Shaw's *Travels into Barbary and the Levant*.) In Tripoli, Tunis, and Algiers, an incision was made on the back of the hand, between the thumb and fore-finger, and a little of the variolous matter put into the wound. According to Dr. P. Ruffel, inoculation is so ancient in these last kingdoms that nobody remembers its first rise; and it has been practised not only by the inhabitants of the towns, but also by the wild Arabs. (See *Phil. Trans.* vol. lvi. p. 140.) It appears, moreover, from this gentleman's account, that buying the variolous matter and inoculating have been ancient customs at Bagdad, Mosul, and Bassora, in Armenia, at Damascus, and all along the coast of Syria and Palestine. The Arabs assured Dr. Ruffel that the puncture might be made indifferently in any fleshy part; but he mostly found the mark between the thumb and fore-finger. Some of the Georgians had been inoculated in the same part, though most of them in the fore-arm. Some of the Armenians had been inoculated in both thighs; but the greater part, like the Arabs, bore the mark upon the hand.

D'Entrecolles, by obtaining access to several medical books at Pekin, discovered one in which an account was given of the introduction of inoculation into China. The author of the book here alluded to, lived in the latter part of the dynasty of Ming. Hence it has been concluded that inoculation has not yet been practised in China 200 years. But in Hindoostan the custom can be traced much farther back. The methods of practising this art by the Chinese and Hindoos are also so widely different, that they cannot have been derived from the same origin. The Chinese take from two to four dried variolous pustules, or scales (according to their size), between which they place a small portion of muck; the whole is then wrapped up in cotton, and introduced into the patient's nostril. The scales before used are kept in a close jar for several years, and when the Chinese are obliged to employ recent pustules, they think it necessary to correct the acrimony of the matter, by exposing it to the steam of an infusion of the roots of scorzonera and liquorice. They sometimes reduce the dried scales into powder, and form them into a paste for the purpose of inoculation.

Dr. Woodville very properly observes, that the application of variolous matter, wrapped in cotton, within the nostrils, must be an exceedingly precarious mode of communicating the small-pox, and may perhaps afford a reason why inoculation in China is less successful than in other countries; for if the matter acts in the way of inoculation, a troublesome inflammation of the Schneiderian membrane must ensue; and, should not this take place, the variolous effluvia, by being inhaled into the lungs, will produce the natural small-pox.

In Hindoostan inoculation is performed by a particular tribe of Bramins. They do not refuse to inoculate on any part; but, in males, they prefer the outside of the arm, midway between the wrist and the elbow, and, in females, the shoulder. The operator first rubs the part with a dry cloth for eight or ten minutes, and then slightly pricks it

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at many points. He next takes a small pledget of cotton, charged with the variolous matter, moistens it with two or three drops of the Ganges water, applies it to the punctured part, fixes it there with a bandage, and orders it to be kept on for six hours. The bandage is then to be taken off, the pledget being left to fall off of itself. The matter in the cotton is always taken from pustules of the preceding year, fresh matter, and such as is the product of the natural small-pox, being considered improper. See Holwell's Account of the Manner of inoculating in the East Indies.

It was immediately from Constantinople that the English first derived a full knowledge of the advantages of inoculation. The beneficial consequences of the practice among the Turks, were detailed by Dr. Emanuel Timoni, communicated by Dr. Woodward to the Royal Society, and published in the Transactions of that body for the year 1714. The Byzantine mode was to take some fresh variolous matter in a glass vessel, and drop it on punctures or scratches made with a needle or lancet in any fleshy part, but especially in the arm and fore-arm. The matter, which was dropped on the punctured place, was well blended with the drops of blood issuing from the wounds, by means of a blunt stile or ear-picker. The part was then kept covered with a walnut shell for a few hours, in order to prevent the matter from being rubbed away.

Another account of the Byzantine mode of inoculation was afterwards published by Dr. Pylarini in the same volume of the Transactions of the Royal Society for 1716. But the year before this gentleman's observations appeared, surgeon Kennedy had printed an account of the new method of inoculating at Constantinople, in his "Essay on External Remedies," and he seems to be the first British author on the subject of inoculation. Soon afterwards, lady Mary Wortley Montague, the wife of the English Ambassador at Constantinople, in her letters, confirmed the accounts of the remarkable manner in which the severity and mortality of the small-pox were diminished among the Turks by means of inoculation; and, in one of her epistles from Adrianople, she expressed her intention to try the experiment upon her own little son. See vol. ii. let. 31.

The mode of performing the operation at Constantinople gradually became more and more simple. We learn from Pylarini, that, in 1701, incisions were made in the forehead, cheeks, chin, and also in the extremities, for the purpose of inoculation. Timoni likewise, twelve years afterwards, mentions, that the operator is to make several little wounds in one or more places of the skin, and these succeed best in the fleshy parts of the arm. In the year 1717, the insertion of variolous matter, at a simple puncture in each arm, seems to have been the prevailing method of inoculation, as will appear by the following relation: Mr. Maitland, surgeon to the honourable Wortley Montague in his diplomatic character at the Ottoman court, informs us, that the ambassador's lady, being convinced of the advantages of inoculation, determined that her only son, then six years of age, should undergo the operation. For this purpose, she desired Mr. Maitland to procure the variolous matter from a proper subject, which being done, an old Greek woman, many years in the constant habit of inoculating, was employed to insert it. "But (says Mr. Maitland) the good woman went to work so awkwardly, and, by the shaking of her hand, put the child to so much torture with her blunt and rusty needle, that I pitied his cries, and therefore inoculated the *other arm* with my own instrument, and with so little pain to him, that he did not in the least complain of it." (Maitland's Account of Inoculating the Small-pox, p. 7.) The consequent disease was very mild, and, if the mode of buying the small-

pox be excepted, this inoculation, which was done at Pera, near Constantinople, in March 1717, was the first ever practised upon any English subject.

The inoculation of the small-pox was first regularly adopted in England in the month of April 1721. The practice, in all probability, would not have been so soon pursued by the faculty, had it not been for the enlightened and philosophic mind of lady Mary Wortley Montague. After this celebrated lady had witnessed the good effects of inoculation upon her son at Pera, she determined also to try it upon her daughter, then an infant three months old; but for certain domestic reasons, the operation was at that time deferred, so that this child was fortunately reserved to be the first example of inoculation in England, which was done by Mr. Maitland, in April 1721. According to Dr. Woodville, writers have universally erred, in dating this event in April 1722, and making it subsequent to the inoculation of the malefactors at Newgate. He notices that Mr. Maitland's pamphlet, in which all the circumstances are stated, was published in February 1722, as appears by the advertisement prefixed to the work. Therefore Mr. Maitland, in saying April *last*, could mean no other than that in the year 1721. Besides, Mr. Maitland expressly mentions, that this was the first example of inoculation in England.

After the successful result of this case, Mr. Maitland performed the second inoculation ever done in this country, in the month of May 1721, upon the son of Dr. Keith, and with the best effects. Notwithstanding these confirmations at home of the favourable accounts of the practice which had been already received from Constantinople, and notwithstanding the firm and powerful patronage which the Byzantine inoculation met with in lady Mary Wortley Montague, it is a fact, that such was the suspicious caution with which the method was received, that several months elapsed before a third trial of it was made in London. Indeed, the very next experiment that was undertaken strikingly evinces the dangerous light in which inoculation was still regarded; for it was determined that several culprits in Newgate, who had forfeited their lives to the laws of their country, should, on submitting to be inoculated, receive full pardon by the royal prerogative. Six condemned criminals were inoculated by Mr. Maitland, on the ninth day of August 1721, in the presence of several eminent physicians and surgeons. These malefactors all obtained a remission of their sentence on very easy terms. None of them had the disease severely, and one, who had already had the small-pox, was of course not affected a second time. A seventh criminal, a young woman, was next pardoned, on condition of having the Chinese method of inoculating tried upon her, at the wish of Dr. Mead. Consequently, some cotton, moistened with variolous matter, was introduced in her nostrils; the distemper followed in a mild form: but the patient suffered violent pains in her head, from the commencement of the eruption to the maturation of the pustules.

After these public proofs of the safety and advantage of inoculation, objections and doubts were still adduced against the method. Some considered the cases too few, while others, in consequence of the small number and mildness of the pustules, thought it doubtful whether the genuine small-pox had been at all communicated. Hence, in the course of the following six months, Mr. Maitland inoculated only eight subjects, who all recovered, though two, it must be confessed, had the small-pox so severely, as to be for some time in danger. See Maitland's Account of Inoculating the Small-pox, 1722.

Maitland's publication was immediately afterwards followed by a letter from Dr. Nettleton, who, in December

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1721, and the two subsequent months, had inoculated with success upwards of forty persons at Halifax, in Yorkshire. This relation influenced the public very considerably in favour of the new mode of communicating the small-pox.

Early in the spring of the year 1722, inoculation began to be adopted in various parts of England; and by order of her royal highness the princess of Wales, it was practised first upon six, and afterwards upon five charity children, belonging to the parish of St. James's. The success of these trials induced her royal highness to have the princesses Amelia and Carolina inoculated on the nineteenth of April 1722, by serjeant surgeon Amyard. Both these younger branches of the royal family passed through the small-pox, in a very favourable manner; and inoculation, in consequence of this illustrious example, was now making a rapid progress: when unfortunately the practice received a great check, by the death of the earl of Sunderland's son, and by that of lord Bathurst's servant, after being inoculated. A Miss Rigby also died, about eight weeks after her inoculation, making the third death. Therefore, out of 182 inoculations, in 1721 and 1722, three died; or nearly one in sixty.

About the time when the first death happened in London, accounts were received in town, stating that the practice had been tried to a much greater extent in New England. It appears that, after an absence of nineteen years, the small-pox had broken out with a great mortality at Boston, in April 1721. This induced the Rev. Mr. Mather to publish the account of inoculation, as related in the Philosophical Transactions by Timoni and Pylarini. This publication, which was distributed to all the medical practitioners at that place, was the means of inciting Dr. Boylston to commence the practice of inoculation upon his own child, and two negro servants, at the latter end of June 1721. In the course of six months, he inoculated in and about Boston 244 persons. Of this number six died.

The reports which came from New England, were employed with great exaggeration by the opponents of inoculation, who seized with avidity every circumstance that might have the least tendency to retard the progress of the improvement.

During 1723, the practice of inoculation became much more general in England, the number of inoculated this year far exceeding the numbers in the two preceding years taken together. It amounted to 292, which, added to 182, makes the whole number of inoculations in the years 1721, 1722, and 1723, to be 474, of which number, according to Dr. Jurin, nine died.

It deserves notice, that several of these nine cases were not generally admitted as deaths altogether in consequence of inoculation. But even allowing that they were so, the chance of recovering from the inoculated small-pox must appear infinitely greater than from the casual. For it was proved, that at this time, out of 14,559 persons who had been affected with the natural small-pox, 2351 died; nearly one in six, or five out of thirty-one.

In 1724, there were only forty persons inoculated. Their royal highnesses prince Frederick and prince William, however, were in this small list. Dr. Jurin accounts for the seeming decline of inoculation this year, by the fact that people will not easily submit to a practice in which they apprehend risk, unless impelled by the dread of a greater danger. Now it appears that in 1724, the natural small-pox was much less fatal than in 1722 and 1723, and it is to this cause we are to refer the above small number of inoculations. That the practice had not fallen into disrepute is manifest; for Dr. Jurin informs us that in 1725 the natural small-pox was very mortal, and of course, people being frightened, resorted to

inoculation again in a larger number. Of the above-mentioned forty, one is recorded to have died.

In 1725 and 1726, 256 persons were inoculated, of which number four died.

In the years 1727 and 1728, the practice of inoculation did in reality begin to decline; for, though the small-pox was very prevalent and fatal, only 124 inoculations took place in these two years, and three of the cases proved fatal.

We find that up to 1729, 897 persons had been inoculated in England, of whom seventeen are reported to have died. But on the other hand, the records shew, that of 18,229 persons, who had been affected with the natural small-pox, during the first eight years of inoculation, 3008 died under the disease; or about one in six; whereas, the deaths by inoculation, admitting the utmost number contended for, does not exceed one in fifty. The reason why more died of inoculation at this early period of the practice than has been the case of late years, is justly ascribable to the better manner lately adopted of treating inoculated patients. Besides, formerly it was common to inoculate adults, in whom the disease is more disposed to assume a severe form than in children.

Inoculation was not regularly practised in Scotland till the year 1726, when Mr. Maitland performed this operation upon ten persons; but as one of these cases was unsuccessful, the practice was discontinued in that country for twenty years afterwards, and was not revived again without considerable difficulty. At Dumfries, indeed, where the casual small-pox had committed great ravages, inoculation was had recourse to in 1733; but in most other parts of North Britain the method was not introduced till 1753.

In Ireland, inoculation was first performed at Dublin in 1723. Twenty-five persons were inoculated in that and the three following years. Of this small number, three cases terminated fatally.

Inoculation at Hanover was first performed in 1724, by Mr. Maitland, upon his royal highness prince Frederick, and afterwards upon eight children of the Baron de Schulenberg. The example and success of these cases had the effect of establishing the practice in that country.

After 1729, inoculation was seriously on the decline in England; but it made considerable progress in the transatlantic world. In South Carolina, about the year 1738, not less than 800, or 1000 persons were inoculated, of whom only eight died. The account of this success contributed materially to revive the practice in Great Britain. In Philadelphia, likewise, inoculation proved soon afterwards still more favourable; and in St. Christopher's 300 slaves were inoculated, without the loss of one.

Such facts in favour of the practice, and the great fatality of the natural small-pox in Britain, soon led people to adopt inoculation more extensively than ever, and from the year 1738, this beneficial method may be regarded as having been completely and generally established, though partial opposition prevailed long afterwards.

In the year 1746, the institution called the Inoculation Hospital had its rise, though it was not at first so considerable an establishment as at present. Here the success of inoculation did not disappoint the hopes and zeal of its patrons; for out of 593 cases of persons successively inoculated, from the year 1751, only one proved unsuccessful.

In 1754, it was determined to inoculate the three royal children, who had not yet had the small-pox. In the mean time, his present majesty took the disease casually, so that only the prince Edward, and the princess Augusta, were inoculated.

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inoculated. These great examples, and the public approbation of the practice declared by the College of Physicians, gained numerous advocates to the cause, which never afterwards lost ground, till the still safer and milder mode of inoculation with vaccine lymph was brought into notice by the immortal Jenner.

In France, Dr. Boyer is the first writer who has noticed inoculation, which he did in 1717. In 1723, the successful trials of inoculation in England were published at Paris by Dr. de la Cofle, and the consequence was a declaration by the physicians of that city, "that for the benefit of the public, it was lawful to make trials of inoculation." The practice was on the point of having a beginning in the hospitals, under the sanction of the duke of Orleans, the regent, when, unfortunately for the experiment, this nobleman died, and soon afterwards Dr. Hecquet published his "*Raifons de doute contre l'Inoculation*." The sentiments contained in this publication, and in a thesis written at Paris in 1723, the reports of the ill success of inoculation at Boston, and the great mortality of the natural small-pox in London, in 1723, falsely ascribed to the new practice, soon brought the method into disrepute in France, and the design of trying it there was laid aside.

The French paid little attention to the subject again till 1752, when Dr. Buttini, of Montpellier, published at Paris his "*Traité de la Petite Verole communiquée par l'Inoculation*." Two years afterwards, M. de la Condamine read his excellent memoir upon the advantages of inoculation, before a public assembly of the Royal Academy of Sciences at Paris. But, according to Dr. Woodville, the practice was not introduced into France till the 1st of April 1755, when, at the desire of M. Turgot, a child, four years old, was inoculated at Paris. On the 14th of May, M. Chaf-tellux, aged 21, voluntarily submitted to the operation. About this time, Dr. Hofty, who had been attending the small-pox and inoculation hospitals in London, at the request of the French minister, published at Paris the following report:—"That out of 463 cases of persons last inoculated in the hospital, only one had been unsuccessful; whereas, in the Small-pox hospital, it appeared by the registers, that nearly one in four had died of the natural small-pox."—"That Mr. Ranby, principal surgeon to his majesty, had inoculated 1600 persons; and that Mr. Bell, pupil to Mr. Morand, had inoculated 903, without the loss of one."—"That in order to form a just comparative view of the fatality of inoculation and of the natural small-pox, it is only requisite to visit the two hospitals in London, the difference of their reports being so remarkable, that it must convince the most incredulous of the advantages of inoculation." Lastly, "with respect to the inoculation of other diseases along with the small-pox, that no instance of the kind has ever been produced; and that persons have been inoculated with variolous matter, taken from a patient affected with the venereal distemper, yet have thereby received the infection of the small-pox only."

This statement had immense effect in promoting the introduction of inoculation into France; and in the year 1756, the family of the duke of Orleans, and great numbers of the first rank, were inoculated by Drs. Tronchin, Hofty, and others. In 1758, the practice had diffused itself over various parts of France. The inoculated were not, however, very numerous, and one or two unsuccessful cases, joined with false reports, that some persons had taken the natural small-pox after undergoing inoculation, once more cast discredit upon the plan, and excited a violent controversy. The great fatality of the small-pox at Paris in 1763, being imputed to inoculation, the practice was forbidden by parlia-

ment. At length the faculty of physic, and that of theology, were called upon to decide, whether inoculation ought to be tolerated or proscribed. This measure served to increase the disputes; nor was it till a very late period that inoculation was extensively practised in France.

In Holland, inoculation was begun at Amsterdam in 1748 by Dr. Tronchin, who, on finding one of his sons seized with the natural small-pox, immediately inoculated the other. This physician, after his return from Geneva, in 1754, inoculated a great many persons in Holland. Dr. Schwenke, at the Hague, likewise promoted the practice; and so did a society of physicians and surgeons at Rotterdam, who were associated for the purpose in 1757. The method was not, however, very generally adopted by the Dutch, till after 1764, about which time Morand and others had practised it at Amsterdam with striking success.

Inoculation was first introduced into Denmark in September 1754, when the countess of Bernsdorff underwent the process. In 1758, two inoculation houses were established at Copenhagen; and, in 1760, the prince royal was inoculated with success.

In Sweden, the first trial of inoculation was made by Haartman in 1754. The rapid progress of the method in Sweden was owing to the encouragement afforded by the Swedish court. Dr. D. Schultz was deputed to enquire into the success of the plan at the inoculation hospital in London, and the accounts which he gave upon his return to Stockholm in 1755, led to the establishment of inoculation houses in different parts of Sweden. In 1757, the benefits of inoculation were commemorated by a medal.

Inoculation was first introduced at Geneva in 1751, whence it passed into Switzerland in 1753. In the latter country, it was first performed at Laufanne by a lady on her own child.

Inoculation commenced in Italy during the great mortality occasioned in Tuscany and Rome by the small-pox in 1754. Dr. Peverini was the first inoculator, putting out of consideration the custom which had long prevailed in the interior of the country, of women sometimes artificially communicating the small-pox to their children. In 1755, M. de la Condamine was at Rome, where, by his writings and personal influence, he succeeded in reconciling many to the practice. Before 1765, inoculation was practised with success at Venice, Padua, Verona, Brescia, Mantua, Bologna, Milan, Parma, &c. In short, Naples was the only important place where the method had not been introduced.

Inoculation was begun at Hanover almost as soon as in England. The opposition of De Haen, however, kept back the improvement in most other parts of Germany. The Prussians and Austrians were the last to adopt it. At Vienna, inoculation did not make any progress till 1765. The younger branches of the imperial family were inoculated in 1768, and shortly afterwards the emperor established an inoculation hospital in the suburbs of Vienna.

Owing to some unfortunate events of the first inoculations at Berlin, the practice was soon discountenanced in Prussia, nor was it revived till 1774, when Dr. Baylies was invited from Dresden to superintend the method.

Although some persons had been inoculated in Livonia by Dr. Schulenius at an earlier period, the practice was unknown at St. Petersburg till 1768, when it was established there under baron Dimdale. This event must have been to the Russians an immense blessing, since in their country, the natural small-pox used to rage with such severity, that it is said to have annually destroyed two millions of subjects. On the 28th of July, 1768, baron Dimdale inoculated the empress and the grand duke, both of whom speedily recovered.

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The practice made rapid progress; an inoculation hospital was established; and at length Dimdale returned to England loaded with wealth and honours.

In Spain, inoculation was not extensively adopted before 1771, though it had been introduced by a surgeon forty-two years before at Jadrique, a small town in that kingdom, and had not been discontinued in that particular place. Dr. Don Miguel Gorman visited London for the purpose of learning the Suttonian method of inoculation, and returned to Madrid in 1772, where he practised the art upon several of the nobility to the great satisfaction of the court.

Of the Objections which were urged against Inoculation.—Having related the rise and first progress of inoculation in several parts of the world, it seems proper, before reciting the particular methods pursued by the Suttons and baron Dimdale, to notice the various objections and arguments which were adduced for the purpose of suppressing the practice of inoculation altogether. The clamour against the method, indeed, was for many years excessively violent; both physical and moral reasons were brought forward against the system, and men of different professions entered into the controversy.

1. To the objection that inoculation did not produce the genuine small-pox, and consequently could not secure any one from having the disease afterwards, the celebrated Dr. Mead made the following judicious reply. "Now I own I cannot understand how contagion, that is the very seed of the disease, should produce not its own proper distemper, but another of a different kind. Neither, certainly, does it matter by which way the infection is received, provided it brings forth manifest marks of the disease. And as to those, who, after having been inoculated with success, are, notwithstanding this, said to have suffered the small-pox, I must protest that, after the most diligent enquiry, I have not been able to find out one convincing proof of this kind. But to speak plainly, if such a thing happened once, why do we not see it come to pass oftener? Or, what can a single example, supposing it to be true and certain, avail, when innumerable have produced nothing like it?"

2. One formidable objection was, the supposed danger that inoculation might be the means of communicating other terrible and fatal diseases, when the matter was taken from unhealthy subjects. The variolous matter being a poison *sui generis*, it cannot by inoculation communicate any other distemper. The venereal disease is known to be as communicable as any, yet several persons have been inoculated from patients labouring under considerable degrees of the venereal disease, and no ill consequences were ever yet known to follow. Mr. Burge's informs us that he knew of one instance where the matter was inadvertently taken by a surgeon from a young woman, who fell ill of the small-pox, after being admitted into St. Thomas's hospital to be salivated. Three patients were inoculated from this matter, and had the small-pox in the most favourable manner. Nothing particular happened about the wounds, and the patients all grew up healthy subjects. See Burge's "Account of the Preparation and Management necessary to Inoculation, 1754." Dr. Kirkpatrick also mentions in his "Analysis of Inoculation," that he was assured by a respectable surgeon, that a young lady was inoculated by an apothecary from a gentleman's servant, who had a venereal bubo together with the small-pox. The lady, notwithstanding, did very well, and never had the slightest symptom of venereal infection. The assertion, then, that other diseases may be communicated by inoculation remains quite unproved. That other diseases may follow the small-pox no man of common sense will deny; for it is no security against them. Nay, the debility which

it sometimes induces, may even promote the accession of scrofula, consumption, &c.; but since inoculation tends so materially to diminish the severity of the small-pox, it must also have a great effect in lessening and preventing any circumstances, which are to be regarded as consequences of such severity.

3. Perhaps the disease may never attack in the natural way. This objection, one would think, must give way to the bare statement, that, previous to the practice of inoculation, the casual small-pox annually destroyed about two millions of lives in the Russian empire alone, and committed equal devastation in several other parts of the world. It has been observed by Dr. Jurin, in an ingenious paper inserted in the Philosophical Transactions, that it is difficult to ascertain the exact number who die without having the small-pox; but that of all the children that are born, there will, some time or another, die of the small-pox one in fourteen; and that of persons of all ages taken ill of the same distemper, two in eleven will fall victims to it.

From a table of burials it appears that in Edinburgh and St. Cuthbert's parish, during ten years, about one-tenth of the dead was killed by the small-pox.

It may likewise be noticed, that no individual is originally unsusceptible of the small-pox, and though a proportion of mankind might possibly escape the contagion, still the number of victims to the disorder casually taken would be very considerable. During the controversies concerning the advantages and disadvantages of inoculation, enquiries were made from house to house, in several towns, in order to ascertain the number of people, who had had the small-pox in one twelvemonth, when it appeared that nearly one died in every five who had taken the disease; and that of eighty-two persons who were inoculated in these places in the same year, not one died.

Dr. Nettleton, Dr. Whitaker, and some others, made an attempt to find out how many persons had had the small-pox, and how many had died of it in the year 1722. The result was as follows:

	Sick of the Small-pox.	Died.
In several towns in Yorkshire	3405	636
Chichester - - -	994	168
Haverfordwest - - -	227	52
Total - - -	4626	856

This table will serve to depict the general event of the casual small-pox. The mortality was considerable; but it was even much greater at some periods, and in particular parts of the world. On the other hand, inoculation has sometimes been pursued with such remarkable success, that out of a thousand persons inoculated one after the other, scarcely one has perished.

We shall not swell this article with a detail of the numerous physical reasons urged against inoculation, the present state of knowledge renders such a task unnecessary; and all the objections alluded to, have been so often and completely proved to be frivolous and unfounded, that of late years the practice has encountered no opposition, if we put out of present consideration the praiseworthy endeavours to substitute every where the vaccine for the variolous inoculation.

4. The moral and religious objections which were adduced against the practice of inoculation, gave rise to as much dispute as the medical differences of opinion, and certainly operated still more perniciously in prejudicing the mass of people

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people against the art. The plan of bringing diseases upon ourselves, was represented as a Circassian impiety, altogether irreconcilable to a Christian conscience. Those who adopted the practice were branded with the appellations of poisoners and murderers, and were said to be illigated by atheism, quackery, and avarice. One anonymous writer implored the interference of parliament. He observes, "while this hellish principle has so much hold upon mankind, 'tis highly necessary that there should be no doors left open for the practice, at least none that can be shut; that there should be no room for the covering of such horrid things from the reach of the law. Physicians they have already too much latitude in practice, to make havoc of mankind for the satisfaction of their judgment in physic, and increase of their experience; but every quack now may be a hireling to the devil, and, like that banditti in Italy, be ready to do the drudgery of removing heirs, and other obstructing incumbents of many kinds, and to do this under the mask of a cure, inoculating death instead of a disease, and making use of an art never before practised, in a manner not foreseen, and by the laws not yet sufficiently guarded against." See a pamphlet entitled "The new Practice of Inoculation considered, and an humble Application to the approaching Parliament for the Regulation of that dangerous Experiment, 1722."

A sermon was preached on Sunday, July 8th, 1722, against inoculation, at St. Andrew's church, Holborn, by the Rev. Mr. Maffey. His text was "So went Satan forth from the presence of the Lord, and smote Job with sore boils from the sole of his foot unto his crown," chap. ii. v. 78. In this discourse, the Devil was depicted as having first put inoculation in practice upon Job. Inoculation was stigmatized as a diabolical operation, and an anti-providential project, that insults our religion, and banishes providence out of the world.

It is almost unnecessary for us to say, that Job's being afflicted with the small-pox was nothing more than an unwarrantable assertion, and a whimsical conceit of the Rev. Divine. The following epigram on the subject appeared in the Monthly Miscellany for March 1774.

We're told, by one of the black robe,
The Devil inoculated Job;
Suppose 'tis true, what he does tell,
Pray neighbours, *did not Job do well?*

Dr. Wagstaffe had asserted, that it never came into men's heads to take the work out of nature's hands, and raise distempers by art in the human body. (See "Letter shewing the Danger and Uncertainty of inoculating the Small-pox.") To this Mr. Maitland replied in his Vindication, "that the practice of physic is founded upon the principle of curing *natural* by raising *artificial diseases*. What is bleeding, but an artificial hemorrhagy; purging, but raising an artificial diarrhoea? Are not blisters, issues, and setons, artificial imposthumations?"

The virulence and farcism by which the opposers of inoculation were actuated, are well exhibited in the rejoinder, made by another writer, to the foregoing very sensible observation. "Very good, sir, but go on,—what is correction at the cart's tail, but the noble art of muscular phlebotomy? What is burning in the hand, but the art of applying a caustic? What is hanging but an artificial quincy, which makes the patient feel for the ground, and chokes him? What is breaking on the wheel, but the art of making dislocations and fractures, and differs from the wounds and amputations of surgeons only by the manner and intention?"

—A Short and Plain Account of Inoculation, &c. by I. Maffey.

Dr. Maddox, bishop of Worcester, was an able and zealous friend to the cause of inoculation, and preached an excellent sermon in support of the practice. He observed, that it was needless to enter into a disquisition, which is the most proper method of designedly raising the small-pox in the human frame, by carrying the person that is to receive it to the contagious steams, or effluvia; or bringing to him the infected matter. Religious difficulties (if any still remain, concerning a practice that has preserved so many lives, and prevented the heaviest grief in so many families,) are exactly the same, in either method of voluntary communication.

For it is no more invading the prerogative of heaven to occasion one easy and voluntary conveyance of the infection than another, by a slight and hardly sensible rasure upon the arm, than communicating the same distemper, by invisible particles, to that tender organ the lungs, which are so frequently affected by the venom of this disease, when contracted by the breath, or receiving into the body infected particles in what is called the natural way.

Were this preventive method (continues the learned prelate) universally successful, and never once to fail in any instance whatsoever, it is scarcely to be presumed that any objection would be raised against a salutary expedient, to preserve from destruction so great a part of the human species as daily fall by this mortal enemy, when it attacks men as it were in the dark, ignorant of, and unprepared for the assault.

This method of inoculation would then be no more liable to censure than the making a voluntary wound, by incision, to form a necessary drain; or administering any operative medicine, which, upon repeated trials, had proved an unfailling security against any other dangerous and prevailing pestilence or contagion.

But, in order to excite and secure a dependence upon his divine providence, the great Governor of the world has appointed that no human affairs, not even our necessary sustenance, should be attended with such absolute certainty: a very wise appointment, that vain man might not fancy himself an independent being; but, among all the changes and chances of this mortal life, should still look up unto, because he can only be defended by, God's most gracious and ready help.

Experience alone must determine the good or bad consequences of this artificial infection, as it ought to do in all other medical attempts, which, in many instances, are, in reality, little more than curing or alleviating one distemper, by exciting or introducing another. And, in this view, the method now under consideration, of lessening the hazard of a very mortal disease, should be considered in the same light as every other antidote, or preventive attempt in physic or surgery, against any probable, almost certain malady, internal or external.

The philanthropic prelate forebore to derive any strength to the argument, from the great number of noble, venerable, and worthy persons, of every rank and profession, who were in his time the public advocates of this compassionate design: he wished to stand upon its own proper evidence and foundation.

He remarked, that a safe passage through this distemper, like the emancipating slaves, is a deliverance to vast numbers of people kept, as it were, in bondage; who, before they have undergone this abhorred disease, are excluded from many offices in life, and prevented from pursuing their necessary business; and it gives tranquillity and cheerfulness

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to persons of better condition, who, under apprehension of this loathsome and infectious disorder, were all their former days subject to great anxiety and constant fear.

The bishop commented with great ability upon the advantage that inoculation affords of communicating the small-pox at the most favourable time of life, *viz.* infancy, when the disease is most inclined to put on a mild form. He mentioned, authentically, that, out of 1500 persons inoculated by Mr. serjeant Ranby, Mr. serjeant Hawkins, and Mr. Middleton, only three died.

He stated to his congregation, that, from the annual account within the bills of mortality, (in which many places in and near the city were omitted,) it appeared that, in twenty years, *viz.* from the year 1731 to the year 1750, inclusive, no less than 39,115 persons died of this fatal distemper; which, including the places not inserted in the weekly bills, must have been considerably more than 2000 every year, that fell in the two adjoining cities and parts adjacent. And, he noticed, that if only one in seven is supposed to die by the distemper taken in the natural way, then the whole number of persons who, in this period of twenty years, were thus infected, must have amounted to 280,000, of which number no less than 40,000 perished. But if one in every 200 should be supposed to die under inoculation, which is really more than fall by that artificial infection, instead of 40,000, only 1400 would have died in one district in twenty years, had inoculation been universally adopted. Thus the difference in that short period, in one spot, would have been no less than 38,600 lives preserved, besides the numerous posterity that might have been derived from them.

The learned divine insisted, that humanity, regard to our country, the dictates of reason, and the precepts of religion, are all in favour of the system of inoculation.

During the opposition to the introduction of inoculation, many affected to be actuated against it by religious scruples, and the practice was alleged to be unlawful.

In answer to this, the scriptures ask, Is it lawful to save life, or to destroy it? Luke, vi. 9. We should also remember, that, as the fall of man brought the danger of diseases into the world, so to evade, oppose, or destroy it, is not only his right, but duty, if in his power. When danger surrounds us, no conduct is more proper than to inquire into, and pursue the means of escape. To neglect our safety is to sink below brutes, which are taught by instinct to shun the evil to which they are exposed. Inoculation is certainly in many instances a means of saving life, and of moderating the severity of affliction. And, in a moral point of view, wilfully neglecting the means of preserving life must appear almost as bad as the guilt of murder.

The bringing of a distemper on ourselves was likewise represented by bigotted individuals as usurping the sacred prerogative of God.

As to the first part of this objection, if by distempers are meant sickness and pain, the same thing is practised daily in other instances, in concurrence with the scripture dictate, *viz.* of two evils choose the least. Inoculation is not done from a mere wanton desire of imparting any disease, but is performed in order that the patient may go through an unavoidable distemper with the least difficulty, and the greatest chance of recovery. The natural small-pox being highly perilous, it must be a great desideratum to avoid it, and inoculation enables us to do so, by destroying that disposition in the body, without which the disease cannot take place.

Respecting the offence given to God, a reliance on providence does not imply that we are not to prevent or oppose the evils which we foresee, and which we have it in our

power to guard against by prudent precautions. Would these objectors, in other instances, refuse the means of lessening the malignancy and danger of disease, than which the practice of inoculation is no more? Let the assertors of the rights of God say, whether, when God permits the discovery of preserving ourselves, he forbids our using it? If our Maker offers us a remedy, it is offending him to reject it.

It was moreover objected, that the decrees of God have fixed the commission of every disease, and that our precaution cannot prevent what He has determined.

To this it was answered, that, however true it is, our days are determined, &c. yet it is God's revealed will, and not his secret purposes, which we are to regard as the rule of duty. God has required of us to have a tender regard of our lives; and they who disobey him therein are guilty of a degree of self-murder, and will never be acquitted of that guilt by the secret determination of Heaven concerning them. Besides, God, who has ordained the end, has also determined the means leading to it. St. Paul, in his dangerous voyage, had a special revelation to assure him, that all who were with him should escape; and yet, when the seamen were getting out of the ship, he declares, that if they did not stay in it they could not be saved. Acts, xxvii. 31. God purposed to preserve them in the way whereby they were afterwards delivered.

It was likewise contended that we ought not to do evil, that good may come.

On the other hand, it was acknowledged, that if inoculation is, in its own nature, a moral evil, it certainly should be rejected, however great its advantages may seem to be. The prospect of relief from any calamity in life should not tempt us to offend God. But they who make the foregoing objection proceed upon a mistake. Their principle is true with regard to moral evil, but is not so when applied to physical. It is certainly lawful to pull down one house to save a great number from being burnt. This is a physical evil, which can hardly take place without some degree of moral evil; and many other instances may be pointed out, where, for a greater good, a lesser ill is submitted to.

It was further objected, that the patient might die, and then his last moments would be distressed, and the future reflections of his friends grievous.

This objection led many to decline the practice of inoculation, even while they allowed the theory of it to be reasonable. They entertained hopes of escaping the distemper in the natural way, and they had fears of dying in this, and thus they were prevented from undergoing the disorder. But they should have considered what grounds they had for either their hopes or fears, and what was to be advanced to balance the account, in an examination of the different degrees of probability attendant on what they hoped for, and what they were afraid of, in the neglect or adoption of inoculation. Dying is an awful thing; but if inoculation was a *probable and lawful* means of preserving life in a time of danger, it was a duty to comply with it; and what reflection could be more peaceful than that of dying in the way of duty?

It was further objected by the religious opposers of the new practice, that fear was a dangerous passion in the small-pox, and that inoculation increased the causes of fear, by lessening our faith and trust in God.

When the small-pox was left to nature, such were its ravages, that, not to fear, would have been to sink beneath humanity: its consequences were too grievous to be viewed with indifference. Experience manifested the advantages
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and general safety of receiving the disease by inoculation, and so far the practice was a remedy to that just alarm which enhanced the danger, when the distemper was left to itself. As to faith in God, none was desirable, except that which was agreeable to the scripture, and which could never have the effect of creating a disregard to calamities and danger. Inoculation was well proved to be a means of safety, and it would have been as rational to conclude that our lives could be preserved without eating and drinking, as that we should be delivered from danger without a prudent care for our own safety. We are to depend on the care of providence only in the way of duty. To boast of courage and trust in God, while we omit the means of escaping danger which surrounds us, is not faith but presumption.

Thus, when inoculation became a probable means by which life might be saved, the neglect of it, so far from being trust, was presumption.

We shall now take our leave of these theological disputes and scruples, which have now been long removed by the influence of right reason and sound sense. When it was once well ascertained and universally believed that inoculation was really a means of preserving life, the idea of its being criminal to adopt the practice could not have much duration. A very able discussion of most of the foregoing objections was published in a pamphlet, entitled "Inoculation impartially considered, and proved to be consistent with Reason and Revelation," by the Rev. David Some, edited by Dr. Doddridge, 1750.

Of Inoculation, as practised by the Suttons, Baron Dimsdale, &c.—The introduction of the Suttonian practice was regarded quite as a new era in the history of inoculation, from the novelty of the method, and its unparalleled success.

Mr. Robert Sutton, the first of this name, who acquired celebrity as an inoculator, resided at Debenham in Suffolk, where he practised surgery and pharmacy. From the year 1757 to 1767, he inoculated 2514 persons.

Two of his sons, Robert and Daniel, followed the medical profession, and after assisting him during the three first years of his practice of inoculation, Robert established himself as an inoculator at Bury St. Edmund's, while Daniel became assistant to Mr. Bumstead, a surgeon at Oxford. Daniel, on his return to Debenham, in the year 1763, suggested to his father a new plan of inoculation, in which he proposed to shorten the time of preparation to a few days, and not to confine the inoculated patients to the house, but to oblige them to be in the open air as much as possible during the whole progress of the distemper.

The father condemned this scheme as rash and dangerous. Its advantages, however, soon becoming manifest to patients, they evinced a desire of being solely under the management of Mr. D. Sutton. The consequence was, that the father and son separated about the end of the year 1763, when the latter opened an inoculating-house near Ingatestone, in Essex. Here, by public advertisements, he made known his plan of inoculating in an improved way peculiar to himself. The encouragement which he met with may be estimated from his receiving, during the first year, 2000 guineas, and above 6000 the second. His fame spread to the most distant parts of the kingdom; and the numbers that resorted to him for inoculation, constantly filled the village of Ingatestone, so that accommodations could hardly be procured for the purpose. His practice in Kent being also very extensive, he was obliged to employ several medical assistants. In 1767, Mr. D. Sutton removed to London, in hopes of reaping still more emolument; but his receipt fell far short of his expectation.

According to Mr. Houlton's statement, the number of persons inoculated by Mr. Daniel Sutton in the year

1764 was 1629

1765 — 4347

1766 — 7816

13,792

"To the above number," says he, "should be added 6000 that have been inoculated by Mr. Sutton's assistants; so that he may be said to have inoculated, within these three years, 20,000 persons."

Of this number, not one was allowed to have fairly died of inoculation. The venal pen of the preceding writer certainly exaggerated every thing, and great boast was also falsely made of the Suttons having a specific medicine for preventing too many pustules. However, no doubt was entertained that the Suttonian practice was incomparably more successful than any other.

Medical practitioners, struck with the advantages of the new treatment, set about the investigation of the causes. Sir George Baker published the following account of the manner in which Mr. D. Sutton practised inoculation. "All persons are obliged to go through a strict preparatory regimen for a fortnight before the operation is performed. During this course, every kind of animal food, milk only excepted, and all fermented liquors and spices are forbidden. Fruit of all sorts is allowed, except only on those days when a purging medicine is taken. In this fortnight of preparation, a dose of a powder is ordered to be taken at bed-time, three several times; and on the following morning a dose of purging salt. To children, only three doses of the powder are given, without any purging salt. The composition of this powder is industriously kept a secret. But, that it consists partly of a mercurial preparation, is demonstrated by its having made the gums of several people sore, and even salivated others. The months of May, June, July, and August, are preferred as the most seasonable for inoculation. But healthy people are inoculated at any season of the year indifferently. The autumn is held to be the worst season; and an aguish habit the least proper for this operation. No objection is made to any one on account of what is vulgarly called a scorbutic habit of body, or bad blood. The person who is to be inoculated, on his arrival at the house used for this purpose, is carried into a public room, where, very probably, he may meet a large company assembled under the several stages of the small-pox. The operator then opens a pustule of one of the company, choosing one where the matter is in a crude state; and then just raises up the cuticle on the outer part of the arm, where it is thickest, with his moist lancet. This done, he only presses down the raised cuticle with his finger, and applies neither plaster nor bandage. What is extremely remarkable, he frequently inoculates people with the moisture taken from the arm before the eruption of the small-pox, nay, within four days after the operation has been performed. And," says Sir G. Baker, "I am informed, at present he gives the preference to this method. He has attempted to inoculate by means of the blood; but without success. If the operator happeneth not to be at home when the new patient arriveth, this is looked upon as a matter of no importance. And so far is he from any apprehension of accumulating infection, that it is very common for persons, just inoculated, to lie in the same bed with a patient under any stage of the disease, as it may happen; nay, sometimes in a room where four or five people are sick. On the night following the operation, the patient takes a pill. This medicine is repeated every other night, until

until the fever comes on. All this time, moderate exercise in the air is strongly recommended. In twenty-four hours after the inoculation, the operator can often distinguish whether or no the patient be infected. He every day examines the incision; and from hence seems to prognosticate, with some degree of certainty, concerning the degree of the future disease. In three days after the operation (provided that it has succeeded), there appears on the incision a spot like a flea-bite, not as yet above the skin. This spot, by degrees, rises to a red pimple; and then becomes a bladder full of clear lymph. This advanceth to maturation like the variolous pustules, but is the last which falleth off. In proportion as the discolouration round the place of the incision is greater, the less quantity of eruption is expected. And, therefore, whenever only a small discoloured circle is observed, purging medicines, more than ordinary, and more frequently repeated, are held to be necessary.

"The preparatory diet is still continued. If the fever remains some hours without any tendency to perspiration, some acid drops are administered, the effect of which is to bring on a profuse sweat; but in some cases where the fever is very high, a powder or pill, still more powerful, is given. In general, during the burning heat of the fever, the inoculator gives cold water. But the perspiration beginning, he orders warm balm-tea or thin water-gruel. As soon as the sweat abates, the eruption having made its first appearance, he obliges every body to get up, to walk about the house, or into the garden. From this time, to the turn of the disease, he gives milk gruel, *ad libitum*.

"On the day following the first appearance of the opaque spot on the pustules, to grown people he gives an ounce of Glauber's purging salt. To children he gives a dose of it proportioned to their age. Then, if the eruption be small, he allows them to eat a little boiled mutton, and toast and butter, and to drink small beer. But in case of a large eruption, he gives them, on the third day after their having taken the first dose, another dose of the same salt, and confines them to the diet ordered during the preparation."

Sir George, after representing this as the practice of Mr. D. Sutton, ascribes its superior success to the free use of cold air. Dr. Glass, of Exeter, in a publication which appeared shortly after that of the preceding gentleman, imputed the advantages of the Suttonian method to the patient being sweated; while another author, Mr. Chandler, differed from both the former writers, and referred the chief benefit of the plan to the infecting humour being taken in a crude state, "before it has been ultimately variolated by the succeeding fever." Baron Dimsdale likewise thought, that although the whole process might have some share in the production of the success, yet he believed the chief good was owing to the method of inoculating with recent fluid matter, and the management of the patients at the time of the eruption.

In November, 1766, baron Dimsdale published his well known work, entitled "The present Method of inoculating for the Small-pox." The instructions contained in this book have deservedly continued ever since, almost without exception, to regulate the practice of inoculation.

The baron, when the age is left to his choice, avoids inoculating children under two years of age. The subjects considered by him improper for the operation, are such as labour under any acute or critical diseases, or their effects; and also such as have evident marks of corrosive acrimonious humours, or manifest debility.

As for the most eligible season of the year, he thought, that persons generally had more pustules in the spring than any other time; and epidemic diseases (especially fluxes,

intermittents, and ulcerated sore throats) being most frequent in the autumn, the baron did not look upon this as in general the most favourable season. But he was of opinion, that we might safely inoculate at all seasons, provided care were taken to screen the patients as much as possible from heat in summer, and to prevent them from keeping themselves too warm, and too much shut up from the weather in winter. He thought it prudent, however, to avoid inoculation while any peculiar epidemic diseases were prevalent. He recommended a preparatory regimen, so as to reduce the patient, if in high health, to a low and more secure state; to strengthen the constitution if too low, to correct what appears vitiated; and to clear the stomach and bowels as much as may be from all crudities and their effects. Young or middle aged persons, enjoying a good state of health, were strictly confined to a milk and vegetable diet for nine days previous to the operation, during which period they were ordered to take the following powder three times at bed-time, and a dose of Glauber's salt each succeeding morning. The powder was composed of eight grains of calomel, the same quantity of compound powder of crabs' claws, and $\frac{1}{4}$ th of a grain of emetic tartar. For women or children the dose was lessened, according to their age and strength. For those who were of a tender delicate constitution, or valetudinarians, he prescribed a milder medicine, and rather of the alterative than the purgative kind; indulging some with light animal food, and in case of lowness, with a glass or two of wine. The baron preferred the following method of inoculating. The patient to be infected being in the same house, and if no objection is made to it, in the same room with one who has the disease, a little variolous matter is taken from the place of infection, if the subject is under inoculation, or a pustule, if in the natural way, on the point of a lancet, so that both sides of the point are moistened. With this lancet an incision is made in that part of the arm where issues are usually placed, deep enough to pass through the scarf-skin, and just to touch the skin itself, and in length as short as possible, not more than one-eighth of an inch. The little wound being then stretched open between the finger and thumb of the operator, the incision is moistened with the matter by gently touching it with the flat side of the infected lancet. The baron generally performed the operation in both arms, and sometimes in two places in one arm, a little distance from each other. Neither plaster nor bandage is to be applied to the inoculated part. The baron preferred using such matter as was taken during the eruptive fever, it being then in his opinion endued with most activity. When the disease was to be communicated from an inoculated person, he took the matter, not from the secondary pustules, but from the place of inoculation. The second day after the operation, if the inoculated part is viewed with a lens, he says, there generally appears a kind of orange-coloured stain about the incision, and the surrounding skin seems to contract. At this time the baron used to prescribe the following medicine to be taken at bed-time: calomel and compound powder of crabs' claws, of each three grains, emetic tartar $\frac{1}{4}$ th of a grain. On the fourth or fifth day a hardness is perceptible to the finger. The part itches and appears slightly inflamed. He remarks, that a little clear fluid may be seen under a kind of vesication, the part resembling a superficial burn. In general, about the sixth day some pain and stiffness are felt in the arm-pit. This was regarded as a very desirable symptom, as foreboding the near approach of the eruptive symptoms, and the favourable progress of the disease. Sometimes on the seventh, more often on the eighth day, the symptoms of the eruptive fever appear; such as slight

remitting pains in the head and back, succeeded by transient shiverings and alternate heats, which continue in a greater or lesser degree till the eruption is perfected.

The inflammation in the arm at this time spreads fast, and upon viewing the incision with a good glass, it appears for the most part surrounded with an infinite number of small pustules, which increase in size and extent as the disease advances. On the tenth or eleventh day a circular or oval efflorescence is usually discovered surrounding the incision, and extending sometimes nearly half round the arm, but more frequently to about the size of a shilling, and, being under the cuticle, is smooth and not painful. This efflorescence was also regarded as favourable; it accompanies the eruption, every disagreeable symptom ceases, and the pain and stiffness in the axilla go off.

When the eruptive symptoms came on with more severity, baron Dimsdale used to direct a repetition of the last-mentioned powder, and on the following morning three or four stools were procured by a laxative draught.

The baron notices that sometimes the state of the incision is such for several days, that the effects of the inoculation can barely be perceived, the colour about the wound remaining pale instead of changing to red; the edges of the incision spread but little, they remain flat, and are attended neither with itching nor uneasiness of any kind. Nay, sometimes on the fifth, and even on the sixth day, the alteration is so little, as to make it doubtful whether the infection has taken place. Dimsdale sets down such appearances as unfavourable, and implying a late and more untoward disease. To prevent this, he used to direct the powder or pill to be taken each night, and in case it failed to operate by stool, or there was the least disposition to costiveness, an ounce of Glauber's sauce, or a laxative draught, was given in the morning, once or twice, as the case might require. The baron believed that these measures forwarded the inflammation, which he always wished to see, as he had constantly observed, that an early progress on the arm, and an early commencement of the eruptive complaints, portended that the distemper would be mild and favourable; and on the contrary, that when both were late, the symptoms proved more irregular and untoward. The patient, instead of being confined to his bed or room, when the symptoms of the eruptive fever came on, was directed, as soon as the purging medicine had operated, to keep abroad in the open air, be it ever so cold, as much as he could bear, and to drink cold water, if thirsty, always taking care not to stand still while abroad, but to walk about with moderation.

In certain cases, notwithstanding baron Dimsdale found the eruptive symptoms extremely violent, and the patients almost incapable of motion, and apprehensive of cold as the greatest evil, yet he persuaded them to rise out of bed and go out of doors, often supported by assistants, and he allowed them to drink as much cold water as they chose. No sinister accident was the consequence, but, on the contrary, the patients' spirits were revived, and every symptom seemed benefited by the method.

When any uncommon languor happened, a basin of thin broth, or a glass of wine, was allowed in the day, or some white-wine whey at bed-time. Indeed, such things were allowed at any time to tender, aged, or weakly persons. After the eruption was completed, if occasion required, they were indulged in a little well-boiled meat of the lightest kind, as chicken, veal, or mutton.

The practice of baron Dimsdale was certainly, in a great measure, an imitation of the method pursued by Mr. D. Sutton.

We shall conclude this article with a few necessary instructions and references.

1. The age of the person to be inoculated for the small-pox should be as little advanced as possible; but (if it can be avoided) not less than four months.

2. The matter, when convenient, should be taken from a young subject who has the small-pox in a favourable way, and fresh matter should have the preference to such as is old. It deserves particular attention, however, that it is chiefly for the sake of avoiding unprofessional blame that we choose matter from patients labouring under the disease mildly, since experience rather proves, that the lenity or malignity of the small-pox depends very little on whether the matter is taken from one patient who has the distemper favourably, or from another who has it severely. Nor can we wonder at this fact, since the contagion can only be of one sort. Therefore, were a patient much exposed to the casual small-pox, and no matter could be procured from any subject that had the distemper mildly, the surgeon should recommend inoculation with such matter as it would be in his power to obtain.

3. In inoculating, the operator is to make the slightest puncture, or scratch, imaginable in the arm over the place where the insertion of the deltoid muscle terminates. That part of the lancet which is besmeared with the matter, is to be repeatedly rubbed over the wound, and lest the matter be wiped away, it is best not to pull down the shirt-sleeve till the part is quite dry. Some operators prefer introducing the lancet, armed with the matter, obliquely beneath the cuticle. When this mode is followed, it is proper at the time of withdrawing the lancet to press the wound with the finger, so that the parts in contact with the matter may wipe it off the lancet with more certainty.

The works on the inoculation for the small-pox are too numerous to be even mentioned: we would, however, particularly refer to Friend's History of Medicine. D'Entrecolle's Lettres Edifiantes et Curieuses. Avicennæ Opera. Mémoires sur l'Inoculation par M. de la Condamine. Philosophical Transactions for 1722. Monro on Inoculation in Scotland. Holwell's Account of the Manner of inoculating in the East Indies. Maitland's Account of inoculating the Small-pox. Mead de Variolis et Morbillis. Kirkpatrick's Analysis of Inoculation. Some's Small-pox impartially considered, &c. Murray's Hist. Infectionis Variolarum in Suecia. Dimsdale's present Method of inoculating for the Small-pox. Jurin's Account of the Success of inoculating the Small-pox in 1721, &c. and his letter to Dr. Cotesworth. Woodville's History of the Small-pox, &c.

For an account of the inoculation for the cow-pox, now so deservedly preferred to the preceding practice, see COW-POX and VACCINATION.

A particular description of the SMALL-POX will be found under that word.

INOCULATION, *Hospital for*. See HOSPITAL.

~~INOFFICIOUS TESTAMENT, in Law. See TESTAMENT.~~

INOM BARLEY, in Agriculture, a term applied to such barley as is sown the second crop after the ground has been fallowed, or cleaned from weeds.

INORDINATE PROPORTION, is where three magnitudes being in one rank and three others proportional to them in another, you compare them in a different order.

E. gr. If there be in one rank these three numbers, 2, 3, 9; and in another rank, these other three, 8, 24, 36, which are proportional to the precedent, in a different order; so that 2 be to 3 as 24 to 36, and 3 to 9 as 8 to 24; then casting
ing

which are produced by different plants of a low shrubby growth, as those of the gooseberry, currant, and raspberry kinds, when grown alone, and in a separate state. See *STANDARD Fruit-Trees*.

SMALL Key, in *Geography*, a small island in the East Indian sea. N. lat. $10^{\circ} 37'$. W. long. $247^{\circ} 16'$.

SMALL Oat, in *Agriculture*, a name applied to a particular kind of black grain of this sort, in some places. It is hardy, and capable of being grown with success on poor land of the chalky and other kinds. Other names are also given to it; and there is a sort of oat termed the small short, or small shorts, in the farmer's language. See *OAT*.

SMALL Point, in *Geography*, a cape on the coast of Maine, forming the east point of Casco bay.

SMALL Repeat. See *REPEAT*.

SMALL Sallad Herbs, or *Sallading*, in *Gardening*, are such young tender herbs as are made use of through the year, for the purpose of furnishing sallads. For this use, several young seedling herbs of a warm nature are in request to mix with the larger principal sallad herbs, as lettuces, endive, and celery, in order to improve their flavours and wholesome qualities. The sorts mostly in use are cresses, mustard, radish, rape, and turnep; also sometimes cabbage-lettuce for winter and early spring use; all of which, for this use, are in perfection when quite young, that is, while not more than a week, or ten or twelve days old, whilst they remain mostly in the seed-leaf, being then cut up close to the ground for use; for, being mostly of a warm relish, in which consists their chief excellence for winter and spring sallads, if suffered to grow large, and run into the rough leaf, they become of a disagreeable, strong, hot taste; but when used as above, they are exceedingly crisp and tender, with an agreeable warm flavour. For the purpose of sallading, these plants may be obtained young at all times of the year, in the spring and summer in the open ground, and in winter under the shelter of frames and glasses, and occasionally on hot-beds. This sort of sallading is procured by sowing the seeds of the different plants at different times, throughout the whole year.

Winter and Spring Culture.—In the winter and spring it may be raised either in hot-beds, or in the open borders, and, according as it may be required, early or late; but when it is required as early as possible, it must be sown in hot-beds, under frames and lights, &c. or in a bed or border of natural earth under glasses. The sowing should be made on hot-beds any time in December, January, or February; and where a considerable supply is daily required, it may be continued sowing every week or fortnight, in hot-beds, till March, or during the cold weather, for which a moderate hot-bed of dung should be made for one, two, or more garden-frames; but only half a yard or two feet depth of dung, according to the temperature of the season, as the heat is only required to bring up the plants quickly, and forward them a week or two in growth, placing a frame directly thereon, and moulding the bed all over with light rich earth, five or six inches thick, making the surface level and smooth: when, if it is to be forwarded as much as possible, directly sow the seed, which may be done either in drills as shallow as possible, about two or three inches broad, and flat at the bottom, and three inches asunder, sowing the seeds of each sort separately, and very thick, so as almost to cover the ground, only just covering them with earth; or, to make the most of the bed, it may be sown all over the surface, previously smoothing it lightly with the back of the spade, the different sorts separately, and all very thick; and after pressing them all even and

lightly down with the spade, covering them very thinly with earth, by sifting over as much light mould as will only just cover the seed; and as soon as the sowing is performed in either method, putting on the lights. The seeds soon come up, as in two or three days, or less, being careful at this time to give vent to the steam arising in the bed, as well as to indulge the plants with plenty of free air daily, either by tilting the lights in the back or front, according to the temperature of the weather, or by drawing the lights a little down, or taking them quite off occasionally in mild days at first; for the hot-bed being yet new, there will be a considerable steam arising; and the sallading coming up very thick, unless due vent be given to pass off the steam, and admit fresh air, the plants will be apt either to burn or fog, (as the gardeners term it,) and mould off as fast as they come up. Such hot-beds, however, as are not fresh made, do not require this precaution; but in new-made beds it must be strictly observed, till the sallading is all fairly come up, and as long as the strong steam continues. The plants will mostly be fit for use in a week, or ten or twelve days, from the time of sowing the seed.

But in order to have a proper succession, the sowing in the hot-beds should be repeated every week or fortnight during the cold weather; the same hot-bed sometimes retaining its heat, will admit of two sowings, by sowing again as soon as the first crop is gathered: however, to obtain a regular supply daily, it is necessary to continue making fresh hot-beds occasionally. Where only a small quantity may be wanted at a time, and there is the convenience either of cucumber and melon hot-beds, or a hot-house, &c. some seed of each sort may be sown in pots or boxes, and placed in these hot-beds, or the stove, just to bring up the plants fit for use. And where there are not frames and glasses, hand or bell-glasses may be used, or the bed be arched over with low hoop-arches, in order to cover it with mats every night, and in bad weather.

Where, however, there are no hot-beds, in cold weather, early in the spring, part of a warm border, or a bed of light earth in a sunny situation, may be prepared for garden-frames and lights, hand-glasses, &c. raising the ground somewhat to the sun; and having dug it, and raked it fine, sow the seed as above, covering it lightly with earth; and having set on the frames and glasses, the seeds will soon come up, and the sallading be ready a considerable time sooner than in the open ground.

Culture in the full Ground.—From about the end of February, or beginning of March, according to the forwardness or mildness of the season, small sallading may be sown in the open ground, repeating the sowings every week or ten days; the first sowing being performed on a warm border; continuing the sowings in that situation till the beginning or middle of April, when it may be sown in any of the open quarters, and in which the sowings may be repeated weekly, or once a fortnight, as required; but according as the hot weather approaches, sowing in a somewhat shady situation. The ground for each sowing in the different situations should be properly dug, and the surface raked smooth and even.

These sowings are mostly made in shallow drills, which should be drawn with a small hoe, either with the corner, or held edgewise downward, horizontally, drawing the drills along evenly, as shallow as possible, and flat or level at bottom, at three or four inches asunder, in which the seeds should be put evenly all along the bottom, each sort separately, and very thick, covering them in evenly with the finest of the mould, not more than a quarter of an inch deep; or if the smaller seeds are but just covered, it is sufficient;

for when sown very thick, if deeply covered with mould, the plants do not rise regularly. In these early spring sowings, on cold nights, and in all bad weather, it is proper to cover the ground, both before and after the plants begin to rise, with large mats; which will be better, if supported on low hoop-arches, or ranges of pegs stuck in the ground just high enough to support the mats a little from the earth, by which a more effectual as well as forward crop is produced.

But in the latter sowings, when dry warm weather commences, it is proper to give occasional waterings. It is likewise sometimes necessary, where the surface of the ground becomes crusted from wet, &c. as the plants rise thick, to slightly brush over the surface with the hand or a soft broom, so as to reduce the surface mould a little, and promote their coming up.

Summer Sowings.—When the sowings are practised in summer, they should be made more frequently, and the ground be kept watered occasionally, both before and after the plants are come up.

Autumn Sowings.—The sowings may be continued in the open ground all September and October, also occasionally in November, in mild seasons; and until towards the middle of October, they may be made in any open situations; but from the middle or latter end of October, and in November, they must be on warm south borders, performing the sowings as above; and in cold nights, bestowing a covering of mats or hand-glasses, &c. repeating the sowings every week or ten days, or a fortnight, as required.

In gathering young fallading, it should be cut carefully close to the ground, while quite young; in performing which, a large pair of scissors is very convenient.

In order to have good seed, some plants should be preserved annually for the purpose.

SMALL Stones, among *Jewellers*, denote diamonds under the weight of a carat.

SMALL-Work, is used to denote the star and shell-facets of diamonds.

SMALLAGE, in *Botany*, a species of *apium*; which see.

Smallage grows naturally by the sides of ditches, in many parts of England, and is therefore rarely cultivated in gardens: it is biennial, and flowers in August. Care should be taken to distinguish smallage from the poisonous water-hemlock, which grows naturally in the same places with it; the latter has its leaves deeply divided, quite to the pedicle, into three long narrow sharp-pointed segments; whereas those of smallage are only slightly cut into three roundish obtuse ones.

The root is that part which was formerly used in medicine: it is about the thickness of a thumb, whitish, fibrous, of a warm taste, and a fragrant smell; and was reckoned one of the five greater openers of the shops. It was reputed to be grateful and detergent, to promote urine, and to dislodge gravel; and it was also recommended in disorders of the breast, and for promoting expectoration.

The fresh roots, especially when produced in their native watery places, are supposed to participate, in some degree, of the ill quality of those of the hemlock kind, and to be particularly hurtful to epileptic persons and pregnant women.

Its seed was also of the number of the lesser hot seeds, and was thought to possess greater virtues as a carminative and aperient than the root; its leaves having been given in decoction, or the expressed juice of them in nephritic complaints. The root was greatly recommended against suppressions of the menses, and of the lochia, and was even

said to be alone a remedy for the king's evil; but this wants proof.

Smallage is now wholly exploded from the materia medica.

SMALL-POX, in *Medicine*, the *Variola* of authors, a highly contagious and formidable eruptive fever, which occurs in general but once during the life of any individual, and is distinguished by the appearance of pustules on the skin, on the third or fourth day of the fever.

As we have already entered into a brief detail of the little that is known respecting the origin and early propagation of small-pox, (see *INOCULATION*;) it may be sufficient to mention in this place, that it is generally believed that this contagious malady existed in China and Hindoostan, perhaps for some centuries previous to its appearance in Europe; but that there are no very authentic records of its travelling to the west, until the period of the siege of Mecca by the Abyssinians, in the year 572, when it destroyed the invading army. Alexandria being at that time the great mart of Indian commerce, was soon infected with the contagion, and the first description of the disease was given by Ahron, a physician of that city, in the beginning of the following century. From that time it accompanied the Arabs or Saracens in their progressive expeditions, and Europe was contaminated by their invasions of Spain, Sicily, Italy, and France in the eighth century. Previous to this period, it is generally believed that this destructive pestilence was unknown in Europe. This is principally inferred from the silence of all the ancient physicians, Greeks and Romans, who have left us accurate descriptions of many of the diseases, with which we are now familiar, but who have not described the striking and peculiar symptoms which characterize this severe and often fatal malady. Some authors, however, and not without a show of probability, have maintained that such an inference is not strictly deducible from this circumstance. For the ancients were apt to confound every species of fatal fever under the term *pestilence*, and were misled, by their hypothetical doctrines about the four humours, to make no distinctions from a view of the symptoms. Some of the ancient plagues, and particularly that of Athens, described by Thucydides, were manifestly not the *plague* properly so called, but were connected with extensive sores and eruptions on the skin. (See *PLAGUE*.) It has been urged, too, that in a fragment of the works of one Herodotus of Rome, preserved by Aëtius, there is a description of various fevers, accompanied by eruptions, in which the small-pox appears to be distinctly included. It is remarkable, too, that the first Arabian physicians, even Ahron of Alexandria, do not mention the disease as a new malady, but speak of it as one familiarly known; and Rhazes refers to Galen, as having mentioned many of its symptoms. The evidence in support of this opinion is certainly very imperfect, and scarcely sufficient to build a controversy upon; nor is it of any farther importance than as an object of curious inquiry.

All that relates to the history and practice of *inoculation* (which, indeed, should now be superfluous by vaccination) has been also detailed in the article already referred to. At present, therefore, our object is to give only the medical history of small-pox, as it occurs in the casual, or, as it is often called, the natural way; describing, first, its symptoms, with the prognostics, and various tendencies of the disease, and afterwards the best methods of treatment.

The term *variola*, which is of modern origin, is supposed to be derived from *vari*, which are small inflamed tumours of the face, occurring about the period of puberty, and noticed first by Celsus under that appellation. The words *pock*, *pocks*, and *pox*, from the Anglo-Saxon *pocca*, signifying a pouch

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pouch or pocket, and applicable to any pustule or pustular disease, were appropriated early to this formidable malady; and the epithet *small* was subsequently added to distinguish it from a still more recent disease, the *lues venerea*, to which the same appellation was applied.

Several varieties of the small-pox have been noticed by different writers, but they may be all included under the two principal forms, which were so ably pointed out by Sydenham, and which since his time have been commonly recognized under the appellations of the *distinct* and the *confluent* small-pox. Although originating from the same contagion, and not differing from each other essentially, they exhibit a different series of symptoms, pursue a somewhat different course, and require a different mode of treatment, and therefore it is convenient to treat of them separately.

1. *Of the Distinct Small-Pox:—Variola Discreta.*—In this form of the disease, the eruptive fever is moderate, and not easily distinguished from an ordinary attack of common inflammatory fever. It generally begins about mid-day, with a chilliness and shivering, accompanied by a considerable languor and drowsiness, which are soon followed by a great heat, pains in the head and back, sickness at the stomach, with a forenoon or pressure in that part, and in adults, especially if they are kept in bed, with a great disposition to perspiration. In children the sweating does not occur; but they are liable to frequent startings from their slumbers, and on the third day are sometimes affected with one or two fits of convulsion. Sydenham considered this symptom as rather favourable; having observed that it was commonly succeeded by an eruption of a large and mild small-pox. On the evening of the third, or the morning of the fourth day, the eruption appears, and gradually increases during the fourth and fifth days, arising first on the face, and successively on the inferior parts, so as to be completed over the whole body on the last-mentioned day. With the appearance of the eruption, the febrile symptoms abate, and nearly or altogether cease on the following day, with the completion of the eruption. This appears first in small red spots, scarcely eminent, but which, by degrees, rise into minute pimples, which are separate and distinct from each other, and generally not very numerous. The day after their appearance, a small vesicle, containing a clear or slightly whey-coloured fluid, shews itself on each of the spots. For two days these vesicles increase in breadth only, and there is a small depression in their centre. As they extend, they continue to be surrounded with an exactly circular inflamed margin, which, when the pustules are numerous, covers the greater part of the intervening skin, and diffuses somewhat of a damask hue over the spaces between the pustules. Under the touch they are hard, and rather painful, and give the impression of small round seeds under the cuticle to the finger; a circumstance which tends to distinguish them from the vesicles of chicken-pox, which feel like small seeds flattened by pressure.

About the eighth day, the eruption is elevated into spheroidal pustules; and if these are numerous, the increase of their size and the fullness of the surrounding parts occasion a considerable swelling of the whole face, and especially of the eyelids, which are so distended as entirely to close the eyes, and often shine like an inflated bladder. Sometimes, where numerous pustules fix upon the eye-lids, the blindness comes on before the eighth day. The eruption now assumes a whiter appearance; for, as the disease proceeds, the matter in the pustules becomes by degrees more opaque, and at length, as the suppuration increases, of a yellowish colour. A similar progress is observed in the hands, but a little later; so that when the face is becoming rough and yellow, the extremities are becoming smoother and whiter. On the eleventh day the swelling of

the face is much abated, and the inflammation diminished; the pustules are now at their height, and seem quite full. On the top of each a darker spot appears; and at this place the pustule, on the eleventh day or soon after, is spontaneously broken, and a portion of the matter oozes out; in consequence of which the pustule is shrivelled and subsides, while the matter oozing out dries, and forms a crust upon its surface. Sometimes very little of the matter oozes out, but remains in the pustule, becoming thick, and even forming a hard little scab. After some days, generally about the fourteenth or fifteenth, both the crusts and the hardened pustules fall off, leaving the skin on the points which they covered of a brown red colour; and it is only after many days that these red marks are effaced. The distinct small-pox seldom leaves any pits in the skin; but in some cases, where the matter of the pustules has been more liquid, the crusts formed by it are later in falling off, and the points which they covered undergo some degree of ulceration, which partially destroys the substance of the skin, and produces a small excavation or pit. Sydenham and Cullen ascribe this erroneously to the desquamation which ensues.

As the eruption is successive, so the maturation on the body and extremities follows the same course as above described, but a little later. On the tenth and eleventh days, as the swelling of the face subsides, a swelling arises in the hands and feet, which again subsides, as the pustules come to maturity. In the pustules of the hands and arms, indeed, the matter is frequently absorbed; so that at the height of the disease, these pustules appear as empty vesicles.

When the pustules on the face are numerous, some degree of feverishness appears on the tenth and eleventh days, but it ceases again after the pustules are fully matured, or continues only in a very slight degree till the last pustules on the feet have finished their course. In the distinct small-pox this secondary fever is never considerable, and seldom continues longer than the period just mentioned. Under the same circumstances, an abundant crop of pustules on the face, some uneasiness in the throat, and a hoarseness of voice, occur about the sixth or seventh day, and a thin fluid is poured out from the mouth. These symptoms increase with the swelling of the face; and the discharges from the mouth and throat becoming thicker and more viscid, are more difficultly ejected. Some difficulty of swallowing also occurs; so that liquids taken in to be swallowed are frequently rejected, or thrown out by the nose. But all these affections of the fauces abate as the swelling of the face subsides.

Some varieties of the distinct small-pox have been described by different authors under specific appellations, such as the *contiguous*, the *coherent*, the *warty*, &c. small-pox (see Walker's Inquiry into the Small-pox, chap. viii. and Roe's Treatise on the Natural Small-pox, chap. i.); but these are merely more violent degrees of the disease, partaking more or less of the character of the confluent species, and requiring to be treated accordingly.

2. *Of the Confluent Small-pox.*—This form of the small-pox follows a similar course with the preceding species, but the symptoms of every stage are more violent, and several of the circumstances are also different. The eruptive fever especially is much more violent; the pulse is more frequent, sharp, and contracted; the head-ache, and the pain and anxiety at the præcordia, the sickness and vomiting, are more severe; the coma is more considerable, and there is frequently a delirium. In adults there is less disposition to perspiration than in the other species, and sometimes a diarrhoea occurs; and in children epileptic fits are frequent on the first days of the disease, and sometimes prove fatal before any eruption appears,

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appears, or they usher in a very confluent and malignant small-pox.

The eruption appears more early than in the benign small-pox; commonly early on the third day, or on the evening of the second, and scarcely ever so late as the fourth day; except, as Sydenham remarks, in a few rare cases, where it appears to be delayed by some violent symptom, such as an acute pleuritic or rheumatic pain, or a violent pain in the stomach, with sickness and vomiting, which manifestly indicate the confluent and dangerous nature of the forthcoming disease. The eruption too is often preceded by an extensive erythematous efflorescence, like a commencing erysipelas; and sometimes it comes out in little irregular clusters, like the measles, consisting of many crowded red points or pimples. The pimples are always most numerous on the face, and at the same time smaller and less eminent. The little vesicles which form on the tops of the pimples, appear sooner than in the distinct species, and while their diameters extend, they do not retain a circular form, but are of very irregular figures. Many of them run into one another, forming a flat irregular surface, so that the face very often appears to be covered rather with one extended vesicle, than with a number of pustules. And when there is any distinct separation of the pustules, they do not rise to a spheroidal form, but remain flat, and their circumference is not bounded by an inflamed margin, the part of the skin that is free from pustules being commonly pale and flaccid, and not exhibiting the damask hue of the distinct small-pox. The fluid included within the pustules changes about the eighth day from a clear to an opaque appearance, being first whitish and now brownish, but never acquires the yellow colour and thick consistence that appear in the mild species.

In the confluent small-pox, the swelling of the face, which is sometimes absent from the distinct species, but is generally present when the pustules are numerous, never fails to appear, and it comes on more early, and arises to a greater degree, sometimes annihilating every appearance of the features. It abates, however, on the tenth day, and on the eleventh still more. At this time the pustules or vesicles, or rather the extended pellicle, which from the eighth day had become rough and brown, is ruptured; and, shrivelling, pours out a fluid, which concretes into brown or black crusts, which do not fall off for many days, even till after the twentieth day; and, in consequence of the ulceration which takes place under them, pretty certainly leave the surface of the face considerably pitted. On the other parts of the body, and on the extremities, especially the hands and feet, still more than on the trunk, the pustules of confluent small-pox are larger and more distinct than upon the face; but they never acquire the same maturity and consistence of pus as in the properly distinct kind.

The confluent small-pox is attended by two other symptoms of considerable importance, the one in adults, the other in children. The former is salivation, or excessive secretion of saliva, which never fails to accompany the confluent form of the disease in grown persons, and is sometimes seen in a slight degree in the distinct kind. It sometimes begins as soon as the eruptions appear; and sometimes not till a day or two after. The saliva is for some time thin and copious, and easily discharged, having very much the appearance of the ptyalism excited by mercury, except that it does not smell so offensively; but about the eleventh day it becomes thick and more viscid, and is expectorated with great difficulty. The patient is very thirsty, and coughs while he attempts to drink, expelling the liquor through his nostrils. The affection of the throat is also generally aggravated at the same time. The salivation often ceases after the eleventh

day, about which time the hands commonly swell (or at least, Sydenham says, ought to do so); but sometimes, after a complete cessation for a day or two, it returns again.

In children, a diarrhoea occurs frequently in the place of the salivation; but it does not seize them so early as the salivation attacks grown persons. Whenever it begins, however, unless it be checked by art, it attends the disease to its termination.

In the distinct small-pox, as we have already stated, the fever commonly ceases with the completion of the eruption on the fifth day; but it is not so in the confluent species. In the latter, the febrile symptoms only suffer a remission at the time of the eruption, which continues to the period of complete maturation, that is, to the eleventh day, in the latter part of which day it is often renewed with considerable violence, constituting what has been called the *secondary fever*, which is the source of much danger, and is of various duration. The pulse quickens, the heat of the body increases greatly, much thirst, with great anxiety and restlessness, severe head-ache, short and confused slumbers, delirium, and sometimes coma, ensue. These symptoms, indeed, are often so sudden and violent, being accompanied also with suppression of the salivation, and a difficulty of breathing and of deglutition, that, if nothing has been done to alleviate the early inflammatory action, death soon follows. Whence Sydenham speaks so often about the danger of the eleventh day. In other cases, however, this fever is protracted to the fourteenth and seventeenth days, and sometimes even later, and yet terminates fatally. In some instances, these severe forms of confluent small-pox are accompanied by symptoms of great malignancy or putrefecency, as it has been called: purple spots, or *petechiae*, appear in the interstices of the skin between the pustules; and sometimes small black spots, scarcely so large as pins' heads, arise on the top of the eruptions in different places: or a disposition to gangrene under ferous vesicles shews itself; or lastly, various spontaneous hæmorrhages take place from the internal parts, as from the kidneys and bladder, whence bloody urine is discharged; or from the lungs, in bloody expectoration; and sometimes from the intestines, in bloody stools.

From a consideration of the preceding detail of the various circumstances which accompany the different forms and stages of the small-pox, the degree of danger under the various symptoms, and the probable event in particular cases, may be estimated. The following points of prognosis will be obviously inferred. In general, the more exactly the disease retains the form of the distinct kind, it is the safer; and the more it approaches or takes the form of the confluent kind, it is the more dangerous. It is only, indeed, when the distinct kind exhibits a great number of pustules in the face, which are contiguous or coherent, that it is attended with any danger: for it must be observed, that it is chiefly from the crowd of pustules on the face, and not from those on the body, that the danger of the disease is to be apprehended. Particular symptoms will enable us to anticipate particular occurrences. Thus, if the previous or eruptive fever be very violent in its attack, and be accompanied with great prostration of strength, anxiety, and lowness of spirits, with severe head-ache, weeping and redness of the eyes, great pains in the back, a burning heat of skin, and a quick hard pulse;—the occurrence of a confluent eruption may be expected. The more early the eruption, the more danger is to be anticipated; but a retardation of the eruption beyond the fourth day, also implies a probability of a confluent disease. The more gradual the eruption of the pustules, the more favourable; provided

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vided the time of their rising be not protracted beyond the usual limits by diarrhœa, pain, or depressing passions. The more distinctly suppuration takes place about the eighth day, and the more rosy the interstices around the pustules, the less danger is to be apprehended. A sudden cessation of the swelling of the face about the eleventh day, and the non-appearance of that swelling about the eighth day, when the pustules are very numerous, are indicative of great danger; as are also a sudden suppression of the salivation in adults, and of the diarrhœa in children, at the former period; especially if the hands and feet have not exhibited any swelling about that time. If, in the distinct small-pox, convulsions occur in children after the eruption is come out, or after incrustation has taken place, death commonly ensues; or, if the patient survives, a paralysis of some of the limbs often remains. The discharge of pale and clear urine, with frequent urging to pass it, in any period of the disease, denotes great danger.

On the other hand, regular gentle sweats, and a free discharge of urine, which deposits a sediment, are favourable symptoms in every species of small-pox. If, in the turn of the confluent small-pox, the pustules, which were before pale and flat, should acquire a redness or damask-rose colour round their bases, and suppuration come on, the patient generally recovers.

When the small-pox attacks women in a state of pregnancy, it is attended with considerable danger, and commonly produces miscarriage or premature labour. It has been a question among pathologists, whether the connection between the child in the womb and the mother was such as to admit of the infection of the former with the small-pox under these circumstances. Whatever hypothetical differences might exist upon this topic, experience has proved that such infection often takes place in the fœtus *in utero*, though not invariably. It would appear, too, that the child is not affected at the same moment with the mother, but soon afterwards by subsequent infection. For, in a case related by Dr. Laird, a woman in the fifth month of her pregnancy passed through a severe small-pox, which commenced about the end of August: she felt the motion of the child till the month of October, on the 28th of which month she was delivered of a child, which was thought to be of six months' growth, and which had been dead some days. "On the back, shoulders, and side, and particularly about the upper part of the thighs, where the integuments were perfectly sound, there were several pustular elevations, with central depressions, strikingly characteristic of the appearances which distinguish small-pox. The fœtus was placed in the museum of Guy's Hospital, and still distinctly exhibits the characters of the eruption." See *Edinburgh Med. and Surg. Journal*, for April, 1807.

A still more extraordinary circumstance, in respect to the infection of the child in the womb, occasionally occurs; namely, the production of small-pox in the child, in consequence of the mother's exposure to the contagion, although the latter may have been prevented from suffering the disease herself, by having previously undergone that disease, or the cow-pox, and therefore escapes the influence of the infection. Dr. Jenner relates the following case, which came under his observation, in the instance of a lady in London. "A few days previous to her confinement, she met a very disgusting object, whose face was covered with the small-pox. The smell and appearance of the poor creature affected her much at the time; and though she mentioned the circumstance on her return home, she had no idea that her infant could suffer from it, having had the small-pox herself when a child. During a few days after its birth the

little one seemed quite well; but on the fifth day it became indisposed, and on the seventh the small-pox appeared. The pustules, which were few in number, matured completely. Dr. Croft, who attended her, being curious to know the effect of inoculation from one of the pustules, put some of the matter into the hands of a gentleman eminently versed in that practice, which produced the disease correctly. Mrs. W. was not sensible of any indisposition herself from this exposure, nor had she any appearance of the small-pox." Another case is mentioned by Dr. Jenner, in which the child *in utero* was infected with small-pox contagion, and born with the eruption upon it, five weeks after the mother had been vaccinated, and a month after she had been exposed to the contagion of small-pox from three of her children. Whence, as Dr. Jenner justly infers, it is obvious, "that the small-pox virus may affect the human frame, even to its inmost recesses, although apparently secured from its effects, and yet give no evidence of its presence by exciting any perceptible disorder." (See *Medico-Chirurgical Transactions*, vol. i. p. 272. Also, Van Swieten, *Comment. ad Aphor.* 1381; and Dr. Mead's *Discourse on Small-pox*, chap. iv.) Dr. Mead states the following analogous fact. "A certain woman, who had formerly had the small-pox, and was now near her reckoning, attended her husband in the distemper. She went her full time, and was delivered of a dead child. It may be needless to observe, that she did not catch it on this occasion; but the dead body of the infant was a horrid sight, being all over covered with the pustules; a manifest sign that it died of the disease before it came into the world."

Though the confluent small-pox should not be immediately fatal, yet the more violent kinds are often followed by a morbid state of the body, under which various disagreeable and dangerous complaints arise. Whether these consequences may be ascribed, with Dr. Cullen, sometimes to an acrid matter, generated by the preceding disease, and deposited in different parts, and sometimes to an inflammatory diathesis produced, and determined to particular organs of the body, is a theoretical inquiry, which we are not disposed to puzzle ourselves and our readers by pursuing. It is manifest, in general, that the constitution is often left in a state of great debility; does not thrive under the ordinary nutrition; and in many cases exhibits a great tendency to scrofulous inflammation, especially of the glandular system, to chronic derangements of the lungs, mesentery, and other viscera, and to various local affections of the skin, membranes, and bones. Another series of evils, which the confluent small-pox is liable to inflict, is the various degrees of injury and destruction which it occasions in the organs of sense, especially in the eyes and ears. Deafness of one or both ears, and the loss of sight in one or both eyes, is no uncommon result of this formidable malady. It appears indeed, from the records of the humane "Institution for the indigent Blind," that a very large proportion of all that claim its protection have been blinded by the small-pox.

Causes of Small-pox, and of its Varieties.—The only exciting cause of small-pox is the specific contagion, generated in the pustules of the disease itself. In what manner, or at what period of time, this great depopulator of the human race was generated, or what physical circumstances concurred to give it existence, history affords us no means of ascertaining. The absurd speculations of the Arabian physicians, respecting the origin of the disease from some contamination of the fœtus with the menstrual impurities of the mother, deserve no notice. The obvious origin of a disease, (so analogous to small-pox, as to supersede the influence of its contagion on man,) from a disease of the skin

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of the heels of a horse, of which the cow-pox has recently afforded an example, has led some speculators to the more probable conjecture, that the poison of small-pox may have been communicated to the human from some domesticated animal. The camel has been suggested: but it was forgotten, that, though Arabia was the country from which Europe probably received the contagion; yet that that country appears to have received it from the most eastern nations, by its early commerce, among whom it had previously existed from remote antiquity. (See Moore's interesting "History of the Small-pox," 1815.) At present we can only attend to the operation of this contagion, and investigate its qualities from the effects which it produces.

It is evident, that the contagion of small-pox is capable of being communicated, and of exciting the disease in others, both by the actual contact of the fluid of the pustules, and the dried crusts, and by diffusion in a state of solution in the atmospheric air. It may be also fixed and adherent to various substances, such as woollen, linen, cotton, and other materials of clothing, as well as to wood, and other articles of furniture; from which also it may exhale in a state of vapour. Whence a person may be infected, without actual contact either of the diseased, or of *fomites*, that is, of infected substances. We have already stated, however, at great length, under the article CONTAGION, (which see,) the proofs and experiments by which it is rendered manifest, that the influence of this, and probably of most other contagions, by diffusion in the atmosphere, is limited to a very small distance from the source of infection. We refer especially to the experiments of Dr. O'Ryan, of Montpellier, upon that subject, which are related in the article just referred to. See also Dr Haygarth's Plan for the Extermination of Small-pox in Great Britain.

One property of the contagion of small-pox, which it possesses in common with the contagion of measles, scarlet fever, and chicken-pox, but which does not belong to the contagion of gaol-fever, or typhus, nor to that of the plague, nor to the chronic contagious maladies, syphilis, and scabies, is its power of affecting the constitution *but once during the life of the individual*. The occurrence of the disease, under the mildest or the most severe form, equally renders the body incapable of receiving the disease again. This is the general fact; but in regard to none of these eruptive fevers can it be affirmed, without many exceptions: and the small-pox presents many anomalies in this respect. The extreme rarity of a second attack of small-pox was noticed by the Arabian writers; and their admission of such a fact would scarcely be admitted as a proof of its occurrence, since they deemed the small-pox and measles to be but varieties of the same disease. They attempted to explain the occasional recurrence of the disease upon their absurd theory of its origin, supposing that the whole of the menstrual blood, which contaminates the child, is not thoroughly depurated and expelled by the first attack. Even Boerhaave seems to have believed, that the *distinct* small-pox did not invariably secure the individual from a subsequent attack of the *confluent* form; though the latter effectually prevented a recurrence. (See his Praxis Medica, § 1381.) This, however, is not consistent with fact: for some of the most formidable and even fatal attacks of *second* small-pox have occurred in persons previously much pitted and disfigured by the disease. It will not be necessary to enter, in this place, into a very minute detail of the cases of secondary small-pox: it will be sufficient to state the fact, and to refer to some of the authorities on the subject of recent date, since the distinctions between chicken-pox, and the

modifications of small-pox, have been fully established. The celebrated Dr. De Haen has related several very clear instances of second small-pox, which occurred in his own practice. One young man, a student of law, received the contagion twice within three years; the first attack left him pitted, and the second proved fatal. (See his Ratio Medendi, p. ix. cl. 7: also his Epist. Apolog. Responf. ad B. L. Tralles.) One of the most striking cases of this sort, is that of Mr. Langford, whose countenance was "remarkably pitted and leamed" by a former malignant small-pox, "so as to attract the notice of all who saw him:" yet at the age of fifty, he was attacked again with confluent small-pox, which proved fatal to him, and to another member of his family, five of whom received the infection from him. (See Memoirs of the Medical Society of London, vol. iv.) A case of distinct recurrence of small-pox is related by Dr. Laird, in the Edinburgh Journal, already referred to; another by Dr. Bateman, in the Medico-Chirurgical Transactions, vol. ii. p. 31; and Mr. Ring has collected a great number, to the amount of sixty or seventy, in his Treatise on Cow-pox, and in various numbers of the London Medical and Physical Journal, especially in volumes 12, 14, and 15. We may add, that the recurrence of measles, in several cases, has been lately authenticated, by the first medical authority now living, (we mean by Dr. Baillie,) in a paper published in the third volume of the Transactions of a Society for the Improvement of Medical and Chirurgical Knowledge. The scarlet fever appears to be also subject to the same anomalies occasionally. The exceptions, however, are rare in all these eruptive fevers, and the general rule will still hold good. Yet the considerations of these exceptions should remove our surprise, that the cow-pox should not invariably secure the constitution from a subsequent seizure by the small-pox; since its influence on the system is commonly less considerable, than that of the mildest distinct small-pox. We believe, however, that the small-pox, which, under the exceptions, has been occasionally seen to follow the cow-pox, has *always* been much mitigated by the prior operation of the vaccine virus, both in the violence and duration of the symptoms, and that it has never, in these cases, terminated fatally.

It appears, from the preceding history of the symptoms, that the safety and danger of the small-pox depends almost entirely upon the smaller or larger number of the pustules: it becomes very important, therefore, both with a view to the prevention and to the treatment of the disease, to investigate the origin of this difference in the eruption, and in the symptoms which accompany it.

From the difference in the appearance, consistence, colour, &c. of the matter produced, as well as in the number and form of the pustules, and from the various degrees of fever, and other symptoms, which accompany the different species of small-pox, it might be readily suspected, that the contagion itself was different. Experience, however, has completely refuted this supposition: for there are innumerable instances of the contagion arising from a person affected with the mild and distinct small-pox, producing the confluent kind in others; and, on the other hand, it is extremely common to see the distinct kind produced by exposure to the contagion arising from a person affected with the worst confluent small-pox. The practice of inoculation has still farther demonstrated this fact. For the same matter was not unfrequently observed to produce in one person the distinct, and in another the confluent small-pox. And in order that no time should be unnecessarily lost, where persons have been in the most imminent danger from complete

complete exposure to the contagion, inoculation has been immediately performed from a confluent subject; yet the subsequent disease has been distinct and mild. We remember to have heard Dr. Gregory, the able professor of the practice of physic at Edinburgh, assert, in his lectures, that he had once taken matter from the confluent small-pox of a dying child, with which he inoculated two of its brothers: they had both a very mild disease: one of them, however, had previously taken the casual infection, for he sickened in three days from the time of inoculation. Indeed we could state other facts, from the same authority, to prove that matter, taken from the pustules of the dead body, has produced even the mildest form of small-pox. It is manifest, therefore, notwithstanding the prejudices of mankind, that the nature of the original contagion has no influence in modifying the disease which it inflicts: and we must infer, that the various forms which the disease assumes, originate from some particular state of the constitution in the individuals whom it thus variously handles. And this condition of the constitution must be the result of external causes, such as the seasons, and state of the atmosphere; or of internal and personal causes, such as plethora, obesity, irritability, or the contrary, depending on original conformation, or upon indulgence, intemperance, affections of the mind, and so forth. It is not the contagion of small-pox alone, which is variously modified in this way by the existing condition of the constitution; almost all external agents are so modified. The scratch of a thorn will not be felt for an hour by one person; while in another it will inflame and form an abscess, even excite the absorbents, and produce a bubo and fever; or it may run on to gangrene, and occasion death. In like manner, if several people are exposed to cold, by falling into water, for instance, and remaining wet: the effects will be very different individually. Many will escape without inconvenience; some with a common coryza or sore-throat; another will be confined to bed for weeks with an universal rheumatism; another will be attacked with pleurisy, or a spitting of blood, or an inflammation in the bowels. It is precisely the same with the varieties of small-pox: they are not the result of a difference in the cause, but solely of a difference in the state of individual constitutions.

The effect of different seasons upon the human constitution does not admit of very satisfactory explanation. Sydenham and Boerhaave, both able observers of nature, remarked, that the regular and distinct small-pox usually appears about the vernal equinox, when it is epidemic, increasing through the summer, and attaining its height and severity in the autumn, and commonly disappearing with the approach of the winter's cold. They both also observed, that if it commences early, as in January or February, (and Boerhaave adds, more particularly if it has been absent from the place six years,) the following summer will be distinguished by an epidemic of a severe and fatal kind, sparing none who have not previously undergone the disease, and proving extensively destructive.

The internal peculiarities of constitution, which modify the operation of morbid causes in general, and of the contagion of small-pox in particular, are more obvious and intelligible. Various hypotheses about the fermentation excited in the blood, and the free exit or deposition in the skin of the contagious matter, thus multiplied by that process, have been formed to explain this point: and even Dr. Cullen has adopted this absurd humoral notion, and endeavours to point out the circumstances "which determine more or less of the variolous matter to *stick in the skin*, or to pass freely through it." (First Lines, § 598.) But

these notions are inconsistent with facts. In the first place, there is no evidence that the contagion acts like leaves upon the blood, "and assimilates a great part of it to its own nature." (Cullen, loc. cit.) The blood, as far as its properties are cognizable by the senses, possesses no qualities which are not common to all inflammatory diseases. There does not appear, indeed, to be any thing analogous to fermentation in the process. The pus that is generated is the result of the inflammatory action of the vessels of the skin, and is generated in the skin only; it is not floating in the mass of circulating fluids, and detained in the skin, as by a sieve. Whatever, therefore, increases the inflammatory action, increases the number of pustules. Thus, parts of the body that are much heated, as by lying upon them, or keeping them in long and close contact, have a greater number of pustules than others; and parts that are covered with plasters, especially those of a stimulant kind, are always more thickly beset with pustules. If we extend this principle to the constitution generally, we shall find, that those persons who are by nature, their period of life, their mode of living, previous indisposition, the season of the year, or other causes of a more irritable and inflammatory habit, will be more liable to suffer severely from the influence of small-pox. An intelligent writer has stated, from his own observation, that persons of a swarthy complexion, of a dry rigid fibre, not much disposed to perspire, with brown or black hair, which is of a strong texture and in great quantity, are more liable to a severe small-pox than those of a fair complexion, with thin, weak, and light hair, and who are moderately fat, but perspire freely. He remarks, too, that "persons afflicted with the palsy, ague, dropsy, and rickets, have commonly a favourable small-pox; and those afflicted with the two former frequently recover from both." (Roe on the Small-Pox, p. 57.) But the natural irritability may be much augmented or diminished by various circumstances, and thus the danger from the attack of small-pox in like manner increased or lessened. Thus, to use the words of the same author, "if a person should live intemperately, use violent exercise, drink much spirituous liquors, or give any occasion whatsoever to inflammation, before the attack of the small-pox, the disease will prove more virulent, although the natural habit be good. On the contrary, if a person be of an indifferent habit, and an unpromising temperament, but live temperately, eat little animal food, and lead a sober and sedentary life, before the disease attacks him, he bids fair for a happy recovery." We may add, that, upon the same principle, the adult age, as more robust and more connected with full living, is more liable to suffer the disease severely than childhood.

It seems, therefore, satisfactorily proved, "that an inflammatory state of the whole system, and more particularly of the skin," is the cause of the multiplication of the pustules, as well as of the other circumstances, which belong to the confluent small-pox, such as the early eruption, the erythematous rash, the continuance of the fever, the effusion of a more ichorous matter, and from thence the peculiar form, hue, incrustation, &c. of the pustules. See Cullen, First Lines, § 600.

Different causes have been assigned for the superior mildness of the disease, when produced by inoculation, over that which occurs in the casual way. Some have supposed that this advantage arose from having the choice of the matter of infection in the former case; and others have imagined that it was owing to the small quantity of matter which was introduced by the lancet. But from what has been said above, it is manifest that the choice of the matter is of

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no importance; and we know not how small a quantity is received when infection is communicated in the casual way. But it is very obvious, that, by avoiding the causes of an inflammatory diathesis, by lessening this condition when it exists, by shunning the concurrence of other diseases with the small-pox, and by choosing the proper season and time of life, we gain many advantages; and probably these were the principal advantages which inoculation possessed.

Seat of the Small-pox.—It has been a subject of much dispute, though easily determined by observation, whether the pustules of the small-pox affect the viscera and other internal parts. The most respectable testimony in favour of their existence internally, is that of Wrisberg, in the New Gottingen Commentaries, vol. lxvi: but some others have also maintained that they had seen the pustules, upon dissection, upon the internal organs. There is no doubt, however, that such observations have originated in mistake. For all the dissections made by recent and more accurate anatomists have demonstrated, that, beyond the extension of the cuticle, no variolous pustules ever arise. Cotunnus, an Italian professor of anatomy, dissected above forty persons, who died of small-pox, for the express purpose of ascertaining what parts or organs were invested with the pustules. These examinations were conducted with great attention and accuracy, and in the presence of a number of students: and the result was, that, though the mouth, tongue, palate, and top of the pharynx, were often full of pustules, and in some few cases the internal membrane of the trachea was inflamed, and exhibited some effusion; yet not the least vestige of pustules was found upon any of the internal parts, even in the œsophagus. “Etenim quod spectat interiores partes,—certè non vîscus, non membrana, non glandula, non pars demum interior ulla fuit, quæ in tot exemplis apparuerit pustulata.” (Cotun. de Sedibus Variolarum, § xxxix.) The truth is, as we have already observed, the pustules are little *cutaneous* abscesses, the result of inflammation in the skin alone, and not depositories of contagious matter distilling from the blood.

Diagnosis.—It is not easy, in general, to distinguish the fever, which is about to usher in the small-pox, from common simple fever, or from some other febrile diseases; since its early symptoms are not materially different from these. It may be presumed to be variolous fever, when the small-pox is a prevailing epidemic, provided the individual has not undergone the disease; and especially if he may have been in circumstances which rendered the communication of infection probable, or if his exposure to it were well ascertained. On children, the occurrence of a convulsive fit, on the evening of the second, or on the third day, will lead to a suspicion that the small-pox is about to appear. In all cases, however, this doubt will commonly be cleared up by the fourth day, when the small-pox will have appeared.

It is not easy to confound the eruption of small-pox with any other febrile eruption, except the chicken-pox, which, indeed, has not been demonstrated as a distinct disease more than fifty or sixty years. It had been called *variola spuria*, *bastard* small-pox; and even Dr. Heberden, who has the merit of having given the first clear description of the chicken-pox, (see Medical Transactions of the College of Physicians, vol. i. p. 433.) still applied the term *variola* to it; calling it *variola pusilla*. See his Commentarii de Morbis, cap. 96.

The eruption of small-pox is slower and of longer duration than that of chicken-pox, the latter being commonly completed in three days, and being covered with slight brown scabs on the fifth day, at which time the small-pox is at

the height of suppuration. The inflammation round the chicken-pox is very small, and the contents of them do not seem to be owing to suppuration, as in small-pox, but rather to what is extravasated immediately under the cuticle by the serous vesicles of the skin, as in a common blister; whence this fluid appears in a vesicle on the second day, and, upon the cuticle being broken, is presently succeeded by a slight scab. On the third and fourth days, the shrivelled or wrinkled state of the vesicles which remain entire, and the radiating furrows of others, the ruptured tops of which have been closed by a slight incrustation, fully characterize the chicken-pox, and distinguish its eruption from the firm and durable pustules of small-pox. Another circumstance is also to be added to the diagnosis of these two diseases. If the whole eruption of chicken-pox on the face, breast, and limbs, be inspected on the fifth or sixth day, every gradation of the progress of the vesicles will appear at the same time, which cannot take place in the slow and regulated progress of the small-pox. (See Willan on Vaccine Inoculation, p. 95.) We have already noticed the difference in the sensation excited by touching the early eruption of the two diseases with the point of the finger, pointed out by the last-named author.

Since the introduction of the practice of vaccination, which may be deemed one of the greatest benefits ever conferred upon mankind by any individual, the diagnosis between small-pox and chicken-pox has, however, been rendered a little more difficult. For in several cases in which the small-pox has occurred in persons who had undergone the cow-pox (and we have seen that even small-pox and measles are not always securities against themselves), a mitigated and modified small-pox has commonly ensued, of a vesicular character, or of a small horny appearance, which has not gone through the usual stages; but, instead of proceeding to full suppuration, has begun to subside and dry away on the sixth day from the commencement of the eruption. It requires considerable attention, therefore, to discriminate between this variety of mitigated small-pox and the chicken-pox; and decision cannot always be obtained without the experiment of inoculation with the matter of the pustules. The impression under the finger, the form, and regular progress of the small-pox, may be generally recognized, however, up to the sixth day, by careful observation.

Treatment of Small-pox.—Until the year 1798, when Dr. Jenner immortalized his name by the announcement of his great discovery of the properties of the cow-pox, no means of *prevention* could be suggested to any individual, by which he could avoid or protect himself from the small-pox. In all large towns, and especially since the introduction of the practice of inoculation, a constant collection of contagion subsisted, which operated upon every one who visited them, even for a short time, from their more insulated situations in the country, if they remained susceptible of the disease. A preventive, however, is now discovered, and every one may be rendered secure from the influence of this baneful contagion. (See Cow-pox.) At present, however, this valuable preventive is not yet universally adopted, and the small-pox has carried off in this metropolis, during the year which has just terminated (1815), no less than one hundred and twenty-nine persons. We have still, therefore, occasion to study the best mode of treating the disease, under the different forms which it assumes, when it occurs in the casual way.

From a view of the history of the disease, as above detailed, it appears very evident, that the danger and violence of the symptoms are nearly in proportion to the quantity of the eruption; which is again much connected with the degree

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degree of fever that accompanies and precedes it. The first indication, therefore, is, to moderate the eruptive fever.

In the case of inoculated small-pox, this process may be commenced in the interval between the insertion of the matter and the beginning of the disorder, that is, several days previous to the origin of the fever; when, by a light and cooling diet, and by the use of laxative medicines, if the habit be full, the body may be brought into a less inflammatory state; and thus rendered less susceptible of violent inflammatory disease. But in the casual small-pox, we have commonly no warning of the malady, until the eruptive fever actually commences; nor, when it has already begun, can we be certain, from any peculiar symptoms, that it is any thing but an ordinary fever; unless it occurs in persons who, not having previously undergone the disease, have been notoriously exposed to the infection. It is fortunate, however, that our inability to distinguish the fever which is about to usher in the small-pox from common inflammatory fever, is of no moment; since the same remedies are the most appropriate in both cases. The older practitioners, indeed, misled by their humoral hypotheses, about a fermentation in the blood, a struggle of the constitution to rid itself of the scum and dregs that were separated, and a salutary effort to discharge them by the skin, which was supposed to be manifest in the pustules, unfortunately took an opposite view of the subject. They thought it necessary to assist and encourage the fever, and very dangerous to repress it; and therefore they excluded the cool air, kept the patient in a hot bed, and administered warm drinks and cordial medicines. The pernicious influence of this practice (which was extended to all febrile complaints) was first detected by the sagacity of our great countryman, Sydenham, in spite of the hypothetical doctrines, in which he had himself been educated; and his prophecy, that, after his death, his opinion and practice would prevail, has been amply verified. In fact it is now universally admitted, that the more the previous fever is moderated, the more all the ensuing symptoms will be mitigated. According to the degree of violence with which the fever commences, the activity of the measures for moderating it will be various. If the symptoms are not severe, the patient may be recommended not to keep his bed, but to remain, according to the advice of Sydenham, in a cool apartment, having the benefit of cool air; and at the same time to discard animal food, and adopt that of a cooling nature, vegetable decoctions, acidulous fruits, and diluent drinks, such as plain cold water, lemonade, whey, &c. All his drinks should be given cold; and the bowels should be freely opened by some cooling purgative, as by the neutral salts, with a little calomel. If these measures are adequate to keep down the fever, and if, at the same time, the eruption appears early, and in small numbers, the safety of the patient may be considered as ascertained; and no farther treatment, except a continuance of the antiphlogistic system, is necessary. The practice of continuing to give purgatives as the eruption declines, appears to be altogether unnecessary, and may in some cases be hurtful; and it seems to be continued rather in compliance with the exploded hypothesis of separating the contagious matter from the blood, than from any rational inference of experience.

Where the fever comes on, however, with great violence, manifesting early its character, by a quick, hard pulse, intense heat, and thirst, a flushed countenance, inflamed eyes, severe head-ache, a quick and oppressed respiration, with delirium, especially in adult persons, and in those of vigorous or plethoric habits, very active measures should be immediately adopted. In persons of the latter description, the

first object would be to let some blood, the quantity of which must be determined by a consideration of the patient's age, constitution, and habits of life, and of the violence of the symptoms. At the same time, although he cannot obey Sydenham's injunction of sitting up, the cooling plan must be adopted to the fullest extent in respect to his apartment, which should be freely ventilated by the admission of the external air, through open windows and doors, and to his bed, which should be a mattress, and as lightly covered as the season and his feelings will permit. If the skin is intensely hot and dry, much benefit will be obtained, in the most expeditious manner, by sponging the surface occasionally with cold water, or even by the use of the cold affusion. We have known several instances, in which this fever, not being suspected to be the variolous fever, was treated by the cold affusion, with the most decided alleviation of the fever, and of the subsequent eruption. The benefits of this practice in scarlet fever, even during the extension of the eruption over the whole skin, are now generally acknowledged by all physicians who have witnessed the salutary and rapid change which it produces, both in the feelings and in the malady of the patient; being, in fact, the most efficacious physical agent, as well as the most expeditious and grateful, that the whole art of medicine is possessed of; and the only expedient fully entitled to the commendation of the ancient empiric, that of curing "*citó, tótó, et jucundé*." It is, in truth, but the perfection of the cooling system recommended by Sydenham; and when united with cool air, cool drinks, and light coverings, it affords the most certain means of controlling the inflammatory fever.

An active purgative will also contribute to relieve inflammatory action, and should be speedily administered, and repeated according to circumstances. Diaphoretics are also recommended, and if they are not of a stimulating kind, they may be given with advantage: but the most effectual mode of inducing perspiration is by reducing the dry and burning heat of the skin, by cool air and washing.

If, however, these salutary measures have been omitted, or have proved inadequate to prevent a numerous eruption, especially upon the face; if the pustules are not distinct; and particularly, if, on the fifth day, the fever does not suffer a considerable remission; the disease will still require a great deal of attention. It will still be necessary to avoid heat and a heating regimen, and to continue to admit the free access of cool air, although the more active applications of cold, by sponging or affusion with water, need not be continued. The beneficial influence of cool and fresh air, indeed, at all periods of the disease, is very manifest; and in order to impress this truth more strongly, it may not be improper to relate a case or two, from among many that have been recorded, to shew the extent of that influence, even in the later stages. Sir George Baker, in his "Enquiry into the Merits of a Method for inoculating the Small-pox, &c." observes, "The history recorded by Sydenham, of a young man at Bristol, who owed his recovery to his being laid out on a table, as if dead, is sufficiently known. To this history there is a great resemblance in a case which is mentioned by Dr. Kirkpatrick, as having happened in Carolina. Mr. Benjamin Marych had a violent natural confluent small-pox in the hot weather. His attendants thought him dead; upon which the sashes were immediately set open, and a fresh quantity of air, or possibly a wind, rushing in, produced a fresh respiration and motion in the person who was thought dead. When this was observed, they went to put them down again. The patient who saw it, and was speechless, but sensible of the alteration

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and benefit, beckoned with his hand to prevent them; and by degrees entirely recovered." Another case of the same kind is related by a gentleman of great veracity and experience. "In the year 1736, a man who lived as servant with Mrs. Broderop, one of the daughters of archbishop Wake, in Great Ormond-street, had the confluent small-pox; and on the evening of the fifteenth or sixteenth day, his life was entirely despaired of. On the next morning, when I went rather to enquire after him than to visit him, the nurse's report was, that he had grown worse and worse till two or three o'clock in the morning, at which time he ceased to breathe, became insensible and motionless, and appeared to be absolutely dead. About five or six o'clock, the body was removed and placed on a large table, near an open window, with no covering except only a shirt. No sign of life appeared, but the body continued hotter than is common after death. This heat, however, the nurse attributed to the weather. In this state he had remained about an hour, when the nurse heard a sort of sigh, or faint breathing; and it was observed that he had moved his arm across his stomach. Being raised up with some difficulty, he took a spoonful of a cordial medicine, ordered for him on the preceding day; and as soon as he was able to speak, he said the cold air was very refreshing. Being carried back to the bed, he fell into a sweat, and slept three or four hours. About this time I saw him. His pulse was now equal and strong; his respiration better than it had been for several days before; and his senses perfect. The door and windows were left open, and in a few days the man was quite out of danger." (See sir G. Baker's Essay, above quoted; and Dr. Walker's work on Small-pox.) These facts require no comment. They demonstrate the beneficial influence of cool air at all periods of the disease. It is, however, particularly beneficial at the period of which we are now speaking, when a thick eruption is coming out, and the fever does not remit. At this time the exposure to cool air, with the other antiphlogistic measures, will often greatly lessen the indistinct crowd of pustules that is spreading over the face, and occasion a few regular ones to arise, the head will lose its confusion, and the breathing become less oppressed,

At this period of the disease, too, under the same circumstances, it may be necessary, in adult and plethoric subjects, to take away some blood. This, however, seldom requires to be repeated. But a cooling purgative should be administered and repeated, or aided by a frequent repetition of laxative glysters; and the free use of diluent drinks should be permitted.

Most writers from Sydenham downwards, and Boerhaave and Cullen among the rest, have recommended the administration of an *opiate*, every night, under this febrile condition, that continues after the eruption of confluent small-pox has appeared. Sydenham, however, only gave it to patients whose age exceeded fourteen years: but Boerhaave and Cullen specify the fifth day as the time for the commencement of opiates, and mention no exception. It does not appear, that modern experience has confirmed the views of these great physicians: indeed, when Sydenham speaks of using opium or bleeding to effect the same purpose, we are unable to conjecture what powers he ascribed to the former remedy. "Jam non aliis auxiliis (cum in propinquo mors sit) ægro subveniri posse autumo, quam vel *narcotica* affatim exhibendo, vel *sanguinem* liberaliter *extrahendo*," &c. (Obs. Medicæ, sect. iii. cap. 2.) Dr. Walker has justly adverted on this practice, which, however it may alleviate restlessness and pain, in slight cases, unaccompanied by acute fever, is well known to accelerate the circulation, to

harden the pulse, to augment the heat and thirst, to increase delirium, to diminish the secretions; in a word, to aggravate all the symptoms of inflammatory fever, while it fails to produce the anticipated rest, or rather banishes it more effectually. Such we know to be the effects of an opiate in all the *phlegmasiæ*, or acute and visceral inflammation; as well as in the active stages of common fever; and we know no circumstance in the early stage of small-pox, which constitutes any exception to this fact, or which modifies the ordinary operation of the medicine. A steady pursuit of the antiphlogistic plan is a much more effectual foothold of the irritation which the patient suffers. Sydenham and other writers urge the impropriety of interfering with the ptialism, that usually occurs in confluent small-pox soon after the eruption is out, and deem the suppression of it highly dangerous. Yet the tendency of opium to lessen the secretions is well understood: but the principal injury to be apprehended from it is the excitement which it produces. In the later periods of the disease, however, when the febrile excitement is low, and much irritation is kept up by the hardening crasis, the moderate use of opiates is to be recommended.

The antiphlogistic practice, above recommended, should be continued during the progress of the eruption to maturation, unless some particular symptoms of failure of the *vis vite* should ensue. For in every case of small-pox, where the eruption of pustules is numerous, although some abatement of the fever is discernible upon the complete eruption of the spots, yet there is seldom a perfect remission of the fever, the pulse rarely descending below 90 or 100 in the minute. The *secondary fever*, therefore, which occurs about the eleventh day, upon the complete suppuration of the pustules, or at least when these are perfectly full and stretched to their utmost extent, whatever may be the nature of the fluid which they contain, is rather an augmentation of the existing fever than a new fever. The origin of this fever, in the opinion of Sydenham and most of the writers who followed him, was the re-absorption of the virus of the pustules into the blood, as well as the retention of the ordinary perspirable matter, which could not pass off by the skin. Whence they recommended blood-letting, which, they believed, was the most effectual mode of depurating the blood thus contaminated, as the means of cure for this fever. But not only was their theory very bad, (for surely drawing a few ounces of blood from the circulating mass could have no effect in removing the corruption from that which remained in the vessels,) but their practice was often injurious, by reducing the strength of the patient, at a time when the powers of life were about to fail, and require all possible support. Dr. Freind had the merit of pointing out the superior advantages of gentle purgatives in mitigating the secondary fever. The bowels should be gently but steadily opened, in all cases, at the commencement of this fever, provided no diarrhœa has occurred. According to the state of the pulse, and the appearance of the matter in the eruptions, the strength of the patient, and other symptoms, more or less of a cordial plan of treatment must, however, be combined with the laxatives. Light liquid nourishment, with a little wine and water as drink, should be frequently administered; and a decoction or infusion of cinchona, with the mineral acids and a slight aromatic, will be given with advantage. If the disease put on a more malignant character, with petechiæ and hæmorrhages, the cordial treatment must be increased both in quantity and strength; but the state of the bowels must still be regulated. Under this cordial plan, the petechiæ will sometimes disappear; the empty vesicles will become filled with matter; and the ichorous fluid of others be changed into white thick pus;

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pus; the other symptoms of course improving in a similar degree.

Such is the general plan of cure which experience has sanctioned in the small-pox. But in particular cases particular symptoms are very urgent, modifying the character of the disease, and requiring some modification of the method of treatment.

Little can be done to controul effectually the *salivation*, when that discharge is excessive, nor to restore it when it suddenly subsides. In the former case, and when the patient is in danger of suffocation from the viscosity of the saliva, and the difficulty of discharging it, the mouth and throat may be frequently washed or syringed with a gargle containing oxymel, or some of the mineral acids. And, as the saliva often begins to thicken on the eleventh day, Sydenham recommended a blister (which has been often found beneficial) to be applied between the shoulders, on the evening of the tenth day, by way of prevention. The *diarrhœa*, when it occurs spontaneously, being by all writers deemed rather salutary than injurious, should not be interfered with. The *swelling of the head, face, and fauces*, when it is excessive, is highly dangerous, and commonly accompanied by viscosity or suppression of the salivary discharge. The steady pursuit of the antiphlogistic system is the best preventive of this danger, and the free discharge occasioned by laxatives affords the best means of drawing off the determination of the fluids to those parts.

The *head-ache and delirium*, when violent and accompanied with intolerance of light, and other phrenitic symptoms, mark the violence of the fever from the beginning, as well as the too great fulness of the vessels of the head, and therefore demand, not only the most rigid pursuit of the antiphlogistic plan, the free admission of cool air, and active purgation, but also the particular application of cold to the head; the detraction of blood by leeches or cupping from the temples or nucha; or even general blood-letting. The pediluvium is sometimes recommended for the purpose of relieving the head on the principle of revulsion; but we have more than once expressed our doubts both of the truth of the hypothesis and of the advantages of the practice. When the determination to the head is such as to produce actual *coma*, during the eruptive fever, a most dangerous small-pox is to be apprehended; and the cooling evacuating measures just recommended should be carried as far as discretion and experience will justify, and a blister should be applied to the neck.

Inflammation of the throat is a common attendant on all the varieties of small-pox, even the mildest; but in the latter it is slight, and easily relieved by any acidulous and mucilaginous gargle, such as an infusion of figs, acidulated with lemon-juice, apple-tea, or lemonade. But the angina, which accompanies the worst kinds of small-pox, is more acute and obstinate, and from extending to the *glottis*, it frequently produces a considerable degree of hoarseness. It is also increased by the general inflammation and tumefaction of the contiguous parts, and continues till these subside. This symptom is moderated by the antiphlogistic regimen, by blood-letting in inflammatory habits, and especially by the early course of laxatives, which contribute to prevent and diminish all the inflammatory symptoms.

Difficulty of breathing is an alarming symptom in small-pox, and seldom occurs except in the worst kinds, and in the last stage of the disease, especially when it is left to nature, or improperly treated in the preceding periods. In cases where the chest is narrow and contracted, or there is a constitutional predisposition to disease in the lungs, this symptom may occur at an earlier stage. Its appearance

implies a threatening or present inflammation or peripneumony, and requires more than any other symptom the free use of blood-letting, as well as the exhibition of cooling purgatives, and the whole antiphlogistic plan.

Some degree of *suppression of urine* not unfrequently takes place in severe cases of small-pox, especially from bad management in the beginning of the disease; it is commonly attended by costiveness, and is most effectually relieved by promoting the intestinal discharge, especially by laxative glysters. An immediate evacuation is sometimes produced, as Sydenham remarked, by taking the patient out of bed, and supporting him exposed to the cool air in his shirt, but still more effectually by placing his feet on a cold floor or hearth, which commonly induces a speedy disposition in the bladder to contract and expel its contents.

It only remains that we allude to the means which have been devised to prevent the deformity which is too often produced by small-pox by the *pits* which it leaves behind. As the pits have been ascribed to the retention of the acrid matter under the cuticle, and the consequent corrosion of the true skin; so it has been proposed to open the pustules, in order to allow the ichor to be discharged. (See Van Swieten, Comment. ad Aph. 1402.) This plan, however, has not proved successful, and the theory is probably erroneous. Others have proposed the covering of the face in the last stage of the disease, to secure it from the air, and the use of fomentations at the same time with warm milk, and inunctions with unsalted butter, hog's-lard, or oil. Dr. Walker, in his valuable work already often quoted, adopts a similar method, but at a somewhat earlier period. He maintains that the pits do not originate either from the acrimony of the contained matter, from ulceration, or from any loss of substance of the skin; but that they are, in fact, merely *impressions*, made in the tender skin by the pressure of the hardened and desiccated pustules, or scabs, as a seal impresses melted wax. This, however, may be justly questioned; for the skin, tender as it may be, is probably not capable of receiving any impressions so permanent, and must be partially ulcerated, and lose a portion of its substance by sloughing, under each hardening pustule. It is true, however, that the face is chiefly liable to be pitted, from the greater drying and hardening of the crowd of pustules which cover it, and that this may probably be owing to its greater exposure to the air. Whence the early prevention of such exposure, and the softening of the drying pustules, certainly promise the best security against severe pitting. About the tenth day of the disease, sometimes sooner, according to the kind of small-pox, the apices of the pustules on the face change colour, feel rough, and begin to harden, especially about the mouth and chin, which are more chafed by the bed-clothes. At this time, therefore, Dr. Walker spread over the face a mask, of fine old cambric, thinly smeared with a mild liniment, composed of oil, spermaceti, and a little wax. This mask he renewed three or four times in twenty-four hours, and sometimes oftener, especially when urged by the patient, who generally felt an agreeable and refreshing coolness for some time after each application. On removing the mask, the face was gently touched with a soft cambric handkerchief, and exposed to the air for as short a time as possible. By this expedient, he affirms, the variolous matter is seen through the transparent mask to be preserved in a state of fluidity as long as it remains in that state on other parts of the body, or until it is gradually discharged by oozing out. The mask is to be continued till the pustules are perfectly emptied, which happens in the course of ten, twelve, or fifteen days, and in some kinds of small-pox in a longer time. Dr.

Walker

Walker affirms, "in the application of this theory of pits, in the varieties of small-pox that have come under my care, I have constantly found the above mode of treatment to answer my highest expectation, not only in preventing pits in the worst cases of this disease; but must observe an agreeable and unexpected effect, which I have constantly found to accompany it, namely, a preservation of the natural features. Many have experienced such an alteration in the countenances of their friends and children, from the effects of this disease, that they could scarcely know them again. This disagreeable effect has been completely prevented, in every case that I have met with, by the method above directed." (Loc. cit. p. 398.) He adds, however, that the success of this application stands connected with the antiphlogistic and evacuant plan of treatment, which he judiciously recommends, and which accords with that which we have above detailed.

In some constitutions, as we have already stated, the disturbance excited by the small-pox is such as to leave the patients in a state of great predisposition to disease, especially in the glandular system, and all the forms of scrofula are occasionally seen to follow its ravages, as well as some other cachectic conditions. One of the most formidable consequences, however, of confluent small-pox is the loss of sight, which it frequently occasions, and which is so common indeed in this country, that a large majority of the blind who are seen in the streets owe their loss of vision to the small-pox. This, however, is rather the result of the extension of inflammation to the eyes during the attack of the confluent small-pox, than a *sequela* of the disease, and therefore is to be prevented rather by the proper practice during the eruption above detailed, than by any subsequent treatment. With a view to anticipate the morbid consequences, upon the supposition that they arise from the remains or dregs of the contagion still contaminating the blood, it is usual to administer a succession of purgatives, to clear the circulating fluids of these impurities. We do not profess to understand how, by exciting the actions of the exhalents of the intestines, we can draw out of the blood just the impure portion, leaving the rest unpolluted; and consider both the contamination and the purification of the blood as equally gratuitous suppositions. Where the patient comes out of the disease with every appearance of returning health, we do not perceive the necessity of resorting to these hypothetical cleansers, which, if violent, may do harm, and can only be productive of benefit by assisting the digestion and propulsion of the aliments in a gentle way. And where there are appearances of a bad habit of body, or a slow convalescence, more advantages are probably to be obtained by a proper attention to diet and regimen, with a judicious course of alterative and gently tonic medicine, than by the repetition of cathartics. A diet of milk and vegetables, or very light animal fluids, with appropriate exercise, change of air, the tepid bath, and other means which medicine affords of regulating the functions and gradually restoring the strength, should be pursued with diligence, especially where there is a disposition to hectic fever connected with the debility. Some forms of scrofula and cachexia, however, which are more local and unaccompanied by fever, require a more nutritious and cordial plan of treatment, to be determined by the age and other circumstances of the patient.

An able and ingenious project was proposed several years ago by Dr. Haygarth for the extermination of small-pox in Great Britain, turning upon the principle of a general inoculation. (See his *Sketch of a Plan*, &c. in 2 vols. 1793.) It is unnecessary, however, now to enter into any discussion

respecting the efficacy or importance of such a plan; since the discovery of the influence of the cow-pox, by the immortal JENNER, has afforded us an antidote, which requires only a general adoption to supersede altogether that fatal and formidable malady, and to preserve mankind from all the miseries and evils which it has spread over the earth for many centuries past. See COW-POX and INOCULATION.

SMALLS, THE, in *Geography*, rocks in the Irish sea, on which a light-house is erected for the guidance of seamen, about 15 miles S.W. from St. David's Head. N. lat. 51° 44'. W. long. 5° 33'.

SMALRIDGE, GEORGE, in *Biography*, a learned English prelate, was the son of a dyer at Litchfield, in which city he was born in 1663. He was educated at Westminster school, where his fine talents and excellent disposition rendered him a general favourite. In 1682 he was elected to a student's place in Christ's college, Oxford, in which he became in due time a tutor; and his reputation caused him, at an early age, to be selected, with others, as managers of the controversy with Obadiah Walker, master of the University college, a convert to popery. In this connection he published, in 1687, "*Animadversions on the Eight Theses laid down, and the Inferences deduced from them, in a Discourse entitled 'Church Government,' &c.*" About this period he distinguished himself as a votary of polite literature, of which he gave specimens in the "*Musæ Anglicanæ*." He entered into holy orders in 1692, and was appointed minister of Tothill-fields chapel, and he also obtained a prebend in the cathedral of Litchfield. In 1700 he took the degree of D.D., and frequently acted as deputy to Dr. Jane, regius professor of divinity at Oxford. On the death of Dr. Jane, in 1707, he was strongly recommended by the university for his successor, but the Whig interest carried it against him. Being now a celebrated preacher, he was chosen, in 1708, lecturer of St. Dunstan's in the West, London, and he was also appointed a member of the lower house of convocation, and exerted himself very much to procure for his friend, Dr. Atterbury, the prolocutor's chair, on which occasion he pronounced an elegant Latin panegyric on his friend, touching with much feeling and delicacy, as an apologist, upon the heat in controversy imputed to him. Dr. Smalridge, though of the party, avoided the animosities too prevalent in its disputes. He held also a friendly correspondence with Dr. Clarke and Whiston, and was extremely useful in moderating the violent proceedings instituted by the convocation against them. He assisted Whiston in his translation of the Apostolical Constitutions. He proposed a conference with Dr. Clarke on the subject of the Trinity, which was held at the seat of Mr. Cartwright, at Aynho, in Northamptonshire, and in which Dr. Smalridge was the advocate of orthodoxy. These connections caused him to be suspected of an inclination towards Arianism, from which he deemed it necessary to vindicate himself by a letter to bishop Trelawny, a short time before his death. In 1711, Dr. Smalridge was made a canon of Christchurch, Oxford, and afterwards dean of Carlisle. When Dr. Atterbury was promoted to the bishopric of Rochester in 1713, his friend succeeded him as dean of Christchurch. In the following year he was raised to the episcopal bench as bishop of Bristol, and very soon after he was nominated lord-almoner to queen Anne. Upon the accession of George I. he refused to sign the declaration made by some of the bishops, on occasion of the rebellion in 1715, because it contained a reflection on some of the clergy who had joined the Jacobites. This step caused the post of almoner to be taken from him, but he possessed the esteem of the princess of Wales, afterwards queen Caroline, with whom he continued in favour till

